THE METAL INDUSTRY
WITH WHICH ARE INCORPORATED
THE ALUMINUM WORLD, COPPER AND BRASS, THE BRASS FOUNDER AND FINISHER AND
ELECTRO-PLATERS REVIEW

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THE ART OF METAL SPINNING

THE SPINNING OR FORMING OF METALS TOGETHER WITH THE TYPE OF TOOLS, CHUCKS AND LATHE REQUIRED TO PRODUCE THE ARTICLES FROM THE METAL BLANKS.

BY EASY WAY.

Metal spinning is the art of shaping with pressure tools metal blanks or pieces of sheet metal rotated quickly or at the desired speed in lathes suitable for that art and class of work. Sheet metal being ductile can be shaped by bending, hammering and embossing, but nowadays the general and most universal method employed is by the die and power press method, which has proved its efficiency for production and exact duplication of parts. Sheet metal shapes which are now pressed and stamped into various forms were, up to a few years ago, either hammered or spun to the forms by a comparatively few artisans who, by long practice, became experts and held the art well in hand. With the advance and rush of the commercial world the several types of dies have taken the place of old-time hand work, and the younger generation of men know little of this almost lost art because they failed to familiarize themselves with the handwork of their

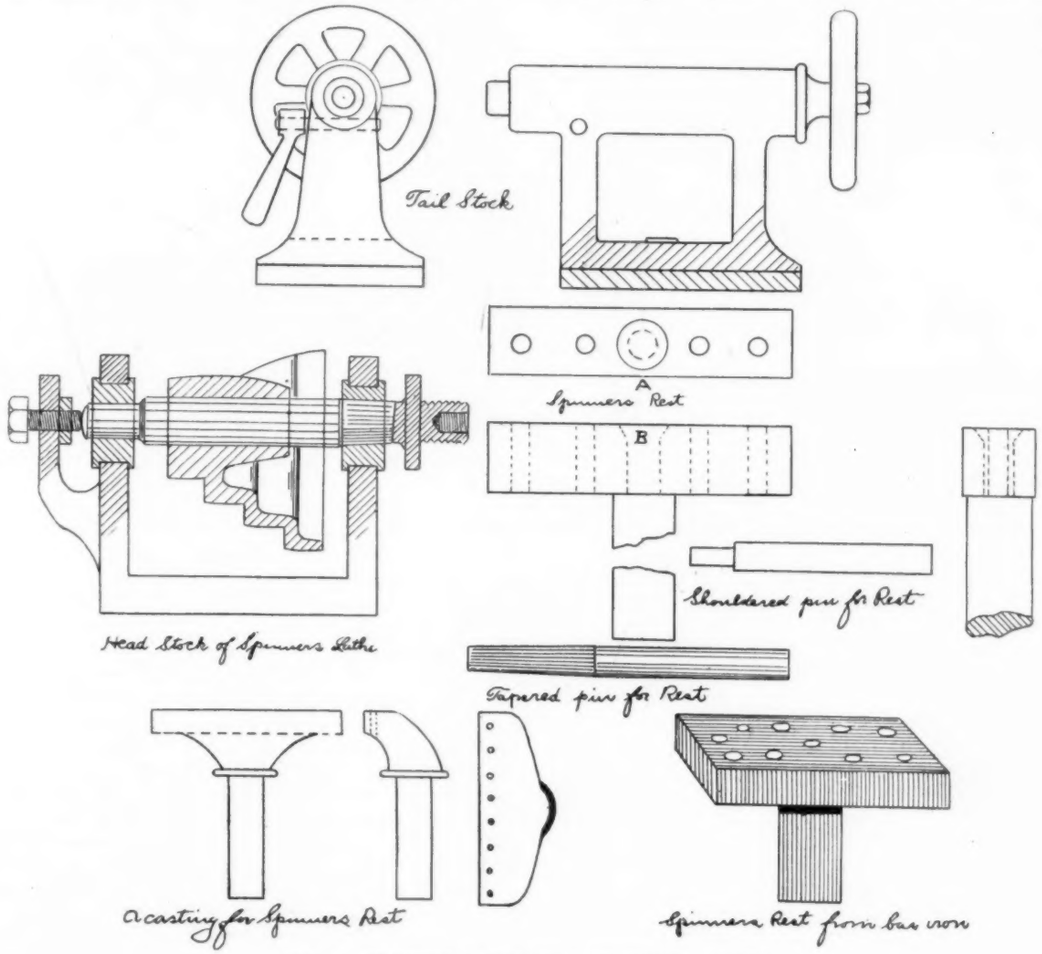
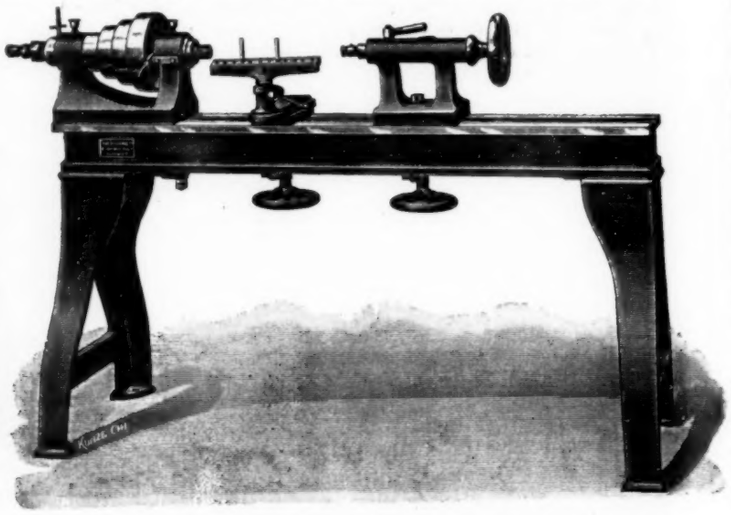


FIG. 1. SHOWING PARTS OF A SPINNING LATHE.

forefathers." Only occasionally will one of the old artisans be found these days, and it is indeed a pleasure to see him shape sheet metal and produce forms that require great care and are very difficult to produce even in die work with the aid of a press. Very often now the sheet metal model for an intricate die is spun in a lathe to obtain the desired shape to obviate the cutting and trying of the steel die blank, and is an up-to-date method to avoid inconveniences and often fatal blunders. Again, however, where only a comparatively few articles of any particular shape are desired, they are spun instead of pressed, to save the cost of the dies.

It is believed by a few in some quarters that pressing and stamping metal can never fully take the place of spinning it, because they think it is impossible to press or stamp some articles except, as they are produced in parts and these parts soldered, brazed and riveted together. As this is manifestly undesirable of many classes of work there has been a persisted endeavor by many producers of dies and equipment to overcome these difficulties, and they have accomplished the undertaking in many complicated and intricate shapes required and produced them in duplicate by machine, which is utterly impossible when hand work is employed.

SPINNING LATHE MANUFACTURED BY P. PRYIBIL, NEW YORK.



SPINNING LATHE MADE BY THE WILCOR MANUFACTURING COMPANY, CHICAGO, ILL.

The modern rush and commercial tendencies, however, can never abolish metal spinning as all large sheet metal plants employ expert metal spinners and call upon them to produce very odd shapes. This is known as the very hardest and most difficult of all lathe work, as never do these artisans get a simple form to produce because their services are thoroughly appreciated and coveted by many. The principal territory for the metal spinner, however, is in the production of forms for ornamental plated ware and, from the standpoint of the craftsman, metal spinning is a craft which is highly desirable of attainment and which may replace beaten-metal work in several instances, or, in many cases, be used in connection with it. For those who contemplate taking up this work the writer will strive to explain in a practical and simple manner the best methods employed in up-to-date, go-ahead sheet metal industries.

This work requires a well-balanced lathe, due to the necessary high speed generally required, but it is possible to spin metal on an engine lathe or speed lathe if either is properly equipped for this class of work. Few industries of machine tools produce a lathe especially for metal spinning, therefore, the plants producing sheet metal articles generally rig up a lathe suitable for their requirements because the ordinary engine lathe does not fulfill the exact requirements of speed. On the other hand the speed lathe, unless it is designed for heavy work, is very liable to be unstable. Many concerns employ a wood-tanners' 6-inch centre lathe, as they are generally made extra strong and will resist pressure as the spindle is housed in two well-fitted bearings with an adjustable take-up for end play and wear.

The screw on the nose of the spindle should be coarse and the collar broad that takes the thrust of the several chucks and forms. It is a great advantage if the spindle nose is bored and threaded to receive a short piece of hardened steel rod, itself tapped or threaded to admit a ¼-inch steel rod. This reason will be explained later. The bed or shears to receive the head and tail stock of this class of lathe is preferably of two well-seasoned beech planks, 6 inches x 2½ inches, about 2 inches apart, if possible, and as a shroud have two flat strips of cold rolled steel 2 inches x 5/16-inch, screwed on with the inner edges parallel. For heavy work the lathe may be driven by an endless belt 1 or 1¼ inches wide, the cone pulley generally having four speeds. The usual overhead counter with tight and loose pulleys are necessary when driven from a line shaft. Nowadays a variable speed motor is installed, and this eliminates the overhead gear as well as the cone pulley on the lathe head when directly connected. A lathe that is driven by gut or cord is suitable only for small work and may be found in many small job shops and operated by foot power.

The head stock generally used by the expert spinner is shown in section at this time to familiarize our readers with the foregoing writing that its advantages may be understood.

The tail stock is of the usual design but with this difference. It must be long and suitable of easy adjustment for accurately centering and alignment. A heavy lathe for the professional metal spinner is generally of 8-inch centers and capable of being raised to 12 inches or even greater heights by means of four

wooden or iron blocks made for the purpose. The lathe employed by the oval spinner is never smaller than 12-inch centre, as they require special fixtures and will be explained later. The diameter of an ordinary spinning lathe spindle is approximately 2 inches in its bearings, and the thrust-collar generally 4 inches diameter, with the nose of the spindle threaded 2 inches diameter, four threads per inch United States Standard form of thread to receive the several chucks and forms.

The back centre or tail stock is of the ordinary type, very strongly made to withstand a heavy side strain when its spindle is advanced some 8 or 9 inches toward the nose of the lathe head. These lathes should have a hand-rest some 8 inches in length at the top and flat. The flat top should be drilled with holes about ½-inch apart, in which round tapered steel plugs or pegs are inserted in turn while the operation of spinning is in progress. These lathes are usually set up on 2½-inch timbers erected edgewise on very firm and substantial supports let into the wall and also supported by legs 4 inches x 3 inches at intervals, due to the length of the supporting bed. The working surfaces of the timbers should have strips of cold rolled steel as a shroud screwed to their faces to better fit them for the wear and strain.

The lathe can be driven from an overhead counter or from underneath or with a motor direct, as may be the most convenient. However, very often this style of lathe is equipped with tight and loose pulleys and driven by a 3-inch endless belt from a 3-foot driving pulley. The principal lathe requirement for good spinning is an even speed, ranging from 1,500 to 2,500 revolutions per minute that can be maintained with but a slight variation, whether light or heavy work is being produced. The parts of the lathe, when equipped for metal spinning which differ from corresponding parts when the lathe is used for metal turning, are the head stock, face-plate, tool-rest and tail centre. The dog, which is used and universally common when a turning tool is employed to prevent the work from slipping in the lathe as it revolves, is never used in metal spinning, and in its place the ordinary centre screw face-plate or outside screw face-plate used in wood turning is screwed fast to the head stock spindle. Upon this face-plate is fastened the block of hardwood, which is held fast to the face-plate by screws while it is turned and finished to the shape desired for the first form to be spun. Then the metal disc to be spun is placed centrally on and against this form and held in place by the tail stock centre, which is brought into contact with it. Always previous to the time when spinning begins the metal is held in place by the friction between the wooden form fastened to the face-plate, over which the metal is to be spun and the tail stock centre. Later the spinning process will be explained thoroughly. Now that we have explained the head stock, tail stock and base of the lathe, let us consider the Trest or hand tool rest, which is the very important part at this time, as we have the metal blank adjusted centrally and ready for the first operation of spinning.

(To be continued.)

HOW A BRASS MANUFACTURING COMPANY FILES SAMPLES

SHOWING THE ADVANTAGES OF RACK STORAGE.

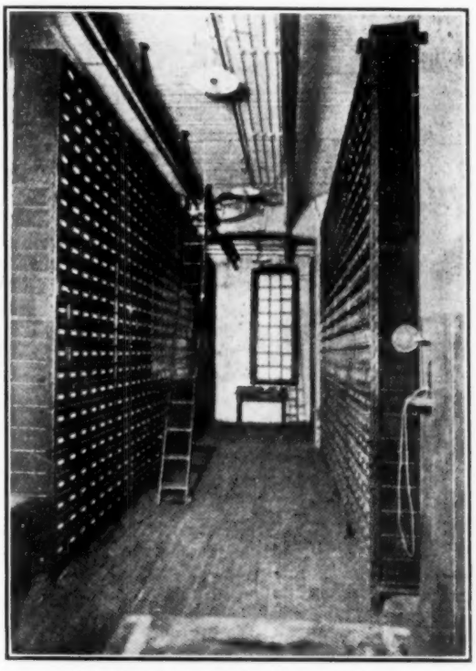
BY P. W. BLAIR.*

When the small brass manufacturing plant, manufacturing the above line of brass goods, starts out in business, the wooden pigeon hole cabinet is the usual receptacle for filing their samples of goods submitted to them for manufacture and sometimes it is only a wooden box or shelf under a bench in a corner.

If you should inform the superintendent or manager of such a concern that the time must come when the capacity for filing ten to twenty thousand samples might be required he would think you were crazy. Yet, such has been the growth of a leading concern in the Middle West, manufacturing the above line of goods. From the wooden pigeon hole file, containing but a few samples, its business has grown to the point where a steel cabinet, Fig. 1, with a capacity for filing twenty thousand samples is now required and the plant is still growing rapidly.

In the growth from the old style filing device to the present efficient equipment a great deal of difficulty was encountered, because the company manufactures special parts to customers' orders or specifications and the compartments had to be reasonably large for holding these samples. The company keeps all samples on file for at least five years from the date of last order. It is essential that each and every sample should always be readily accessible at a moment's notice. When a sample is received, the firm or corporation's name is stamped on same, also the city in which the firm or corporation is located and the date the order was received. Tools are then looked up for the production of the work, drawings and patterns ordered if necessary and a record kept.

After the order is filled a complete record is kept on an index card on the necessary tools, patterns and core boxes used to complete it. A bin number is assigned to the sample, and a sample is kept of one of the complete



THE FILING ROOM FOR SAMPLES.

articles made up from this order and duly stamped and recorded. Sometimes the customer insists on sample being returned with the order. In such cases a duplicate

*Foreman Brass Furnishing Department H. Mueller Manufacturing Company, Sarnia, Ontario.

is always kept, whether the sample is returned or placed in sample bin.

A steel case, Fig. 1, with commodious drawers 6 x 6 x 14 inches was installed. The new case was built to accommodate fifteen thousand samples. All of the drawers were numbered and the columns lettered A, B, C, D and so on. The alphabetical subdivisions are used simply as a check, as all references are made by number only, which appears plainly on the drawers. For reference and location of samples a card index is kept, giving a drawing or sketch of the sample and the prime factors necessary for estimating and full information. These cards are filed alphabetically for ready reference. Much time, worry and wasted energy may be saved by the small manager or superintendent if he will but look ahead and form some definite plan for filing his samples, so that not only will samples be readily accessible but future growth will be automatically cared for.

SALESMEN

AN EFFORT TO DIFFERENTIATE BETWEEN THE REAL AND THE UNREAL.

BY W. H. PARRY.*

We have all encountered alleged salesmen and some that are real salesmen, yet what a sad commentary on the times it is, that not one in fifty knows his business. Let me describe a few of these types of "near salesmen" who infest the factory offices these days and then I will attempt to picture what my idea of a real salesman is, for strange as it may seem, there are a few yet in captivity, but why they are at times allowed the liberty of a road trip is beyond me. Their employers take an awful chance in letting them out of their sight when the need for really competent salesmen was never so great as it is today.

The inebriate whose breath precedes him into your office by about ten feet is not as uncommon as he ought to be. His confidential and sometimes patronizing manner are extremely repugnant and annoying to a busy man. How any concern can have the nerve to send such men on the road and expect to do any business through them is a mystery to me.

Then we have the salesman with the "voice" who may otherwise be a good man, yet as his foghorn is always in splendid condition, he dilates upon the virtues of his goods in tones that could be better employed announcing quitting time in a boiler or drop forging shop. The salesmen who travel in pairs are without a doubt the worst of all the selling afflictions, particularly if one is selling axles and the other axle grease, as they play the game two ways; though factory people rarely fall for their line of talk, as this "double entry system" in salesmanship is a bore that is seldom, if ever, tolerated.

The fresh young salesman whom somebody has "wished" on a long suffering public is familiar to all of us. It does seem a pity that their efforts are not better directed to some line where verdancy is appreciated. I recall such a salesman who was attempting to sell foundry equipment that could be used only in the largest foundries, yet he confessed to me quite airily that he had never been inside of a foundry in all his young and tender life and furthermore knew as near nothing about the goods he was trying to sell as any salesman could and remain unhung. By a little kind questioning it developed that he was the stenographer of the office force and things being slack they chased this young fellow out on the road to sell goods about which he know very little. That reminds me that many young men, who act as stenographers and have acquired a knowledge of the necessary technical terms used in that particular line of business, have an idea they are salsmen because of this knowledge. There have been cases where they have made good, but for every one that did it is a safe bet that ninety-nine did not.

The flashily dressed salesman whose pink socks, green shirt, blue hat and heliotrope vest are one discordant "scream," is not such a bad fellow for all that. I have met men dressed thus, or worse, who were really good salesmen and would have been better had they dressed their part more quietly, as there are many substantial citizens who are as much prejudiced against an over-dressed man as they are against an over-dressed female.

Then we have the pipe-smoking salesman whose person and breath exudes an odor second only to the one manufactured at Barren Island and who will, on occasion, stride into your office with his pipe stuck in his excuse for a face and feels very much hurt when the office boy is ordered to open all the windows and doors so that one will not suffocate. I cannot express in polite language my opinion of the cigarette dope. Why should any salesman, by smoking, make office air worse?

How different are the real salesmen who get the orders and what a real pleasure it is to meet them with their good breeding and most intimate knowledge of the goods they are handling. They don't overtalk their job and you do not have to tell them that you are too busy that day to talk matters over with them and for them to call some other day. They are students of men's characters and whims and know when to be brief and when not to be. They don't offer you a cigar as if they were handing you a million dollars; as a matter of fact, good salesmen never hand out gratuities and they do not hand you any "bunk" either. I could name a half a dozen men who represent first class houses, who are as similar in deportment as any six men could be and every one of them a first class salesman. These men never force themselves into your office, they take their turns with good grace and they are not forever bragging about what stuff they have sold to your competitors in the hope that you will load up with a lot of trash that you don't want. These men are quietly but well dressed, if they drink or smoke they don't advertise it except when they know it will make a favorable impression on the prospect, and to sum it all up, they are always gentlemen.

*Superintendent National Meter Company, Brooklyn, N. Y.

MAGNALIUM FOR PISTONS.

"Magnalium, an alloy of aluminum and magnesium, considerably lighter than aluminum, which has been used successfully for cylinders of gas engines, is now being tried for the making of pistons for automobiles," says Emil Grossman, manufacturer of spark plugs. "For the past few years automobile engineers and designers have been giving a great deal of attention to the reducing of the weight of the various functioning parts of the gasoline motor. Ordinary cast iron used has a tensile strength of from 18,000 to 20,000 pounds per square inch, with a specific gravity of 7.50, while magnalium is claimed to have a tensile strength of 23,000 pounds to the square inch, with a specific gravity of but 2.5.

THE STORY OF A PIN

AN AUTOBIOGRAPHY OF AN IMPORTANT MEMBER OF SOCIETY.

BY ALBERT POTT.*

MR. PIN.

I am just a plain common every-day toilet pin with but a point to stand on and a small—solid—head and a body, a line between the two; yet, while constituting one of the least, I am about the most used article in existence today. First made many, many years ago, yet I have undergone little change, always the same common pin; yet my family has increased amazingly until now I am made by the millions daily. I am about the first article to travel to a new country, am found wherever civilized man is, in homes and many establishments. I am indispensable, and as for the ladies—why, a lady would not be a lady without me. I hold the parts of your clothes together before my sister, the needle, carries her trail of thread to more securely bind them, or the button or loop is put on. I hold your papers and letters together. Thus your tailor or dressmaker, merchant and correspondent find me indispensable. As for the home—what is a home without a pin? And yet, I remember, not many years ago, I was sought for and treasured, for 'twas said:

"See a pin and pick it up,
And all day long you'll have good luck."

But now! Nobody stops to pick me up now. My family multiplies so rapidly—much more rapidly than the little boy's rabbit—that I am swept away when I am dropped to the floor, because it is cheaper to get another of myself than to pick me up. And sadder yet. How many of you stop to think of what I am made and all I have gone through to be just a common pin? While my cheaper self is made of iron, and at my best I am made of crucible steel and hardened, yet, as you best know me, I am made of brass. Without considering the mining, smelting, refining of the ores, etc., of metals which go to make up my composition, of the processes of casting, drawing, annealing and redrawing of my being from a clumsy pig or billet to the long fine wire, how many stop to think of the pounding and scraping, the cleaning and brightening, the coating and dressing up in fancy papers, or boxes, I get before you pay your nickel or dime for a lot of me? Did you ever stop to think of the hundreds of dollars men have spent to produce more and more of me, a common little pin?

I used to be got ready for market much slower than I am now, and many more people had to handle me, but now I am rushed through life so fast that I hardly get time to cool off from the time I start as hot wire from the draw bench till I am dressed in my market clothes, mostly to be used but once, then discarded to make room for another. After coming from the draw bench as wire, I used to be bent and rebent to make me straight in a machine like Fig. 1, but now time is not taken for that, but—Do you see the machine marked Fig. 2A? This now takes me as wire, rudely shakes and bends me to make me straight, pushes me into a tool like a hammer which very rapidly pounds my head into shape; another tool like a knife cuts me off to length, and I am rushed over files or cutters which sharpen the only leg I have and I drop off, a rough pin all covered with dust and oil, at the rate of from 200 to 400 per minute, depending on how big and how good I am.

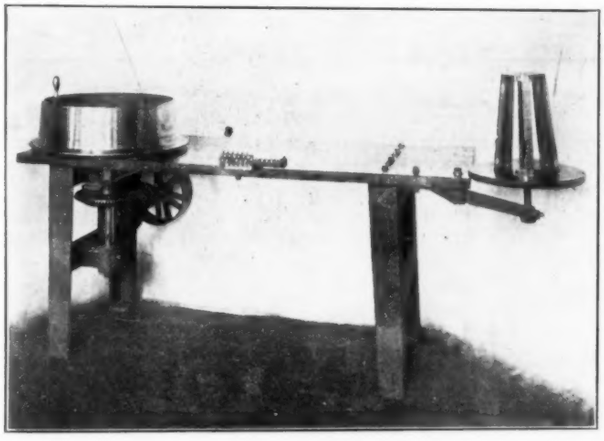


FIG. 1. WIRE STRAIGHTENING BENCH.

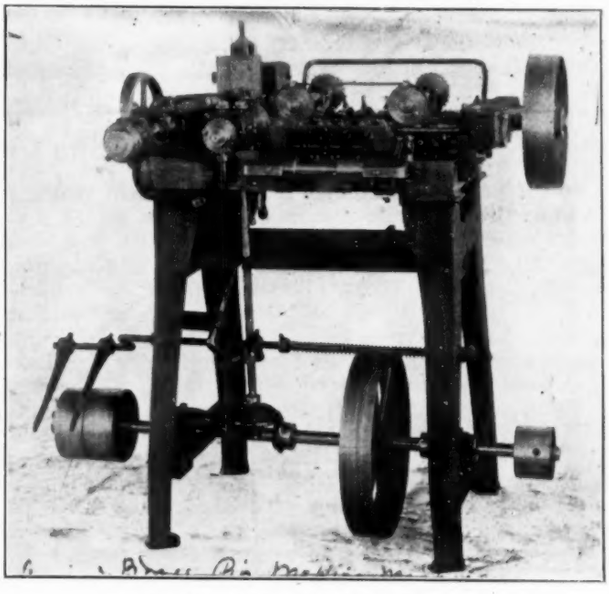


FIG. 2A. BRASS PIN MAKING MACHINE.

No one wants me to be so dirty, so I am washed with thousands of others in hot water and potash or soda, or tumbled in sawdust to smooth and brighten me. I am then separated from sawdust and boiled for about 20 minutes, not to cook or soften me, however—I have become hardened to rough treatment by this time—but to be coated with tin to make me look and wear well. To make me look even better, however, I am again well washed, this time in soap suds, then shined up in sawdust, from which I am again separated to be weighed out with many others into boxes, and then packed and sold in bulk to help make your clothes or hold your papers; or put into the machine marked Fig. 3, where

*Sales Manager, Baird Machine Company, Bridgeport, Conn.

I am separated from my companions and stuck into papers in nice straight appearing rows, like soldiers on parade. Nice girls then roll me up in the paper after seeing my head and point—I have no feet—are as they should be, and I am sent to your stores, and from there carried to your homes, after which my life is generally short, too short, don't you think, after all I have gone through? When you see me again, you will think more of me than you ever did before, won't you? If you saw me lying in the street, you wouldn't stop to pick me up, though, would you?

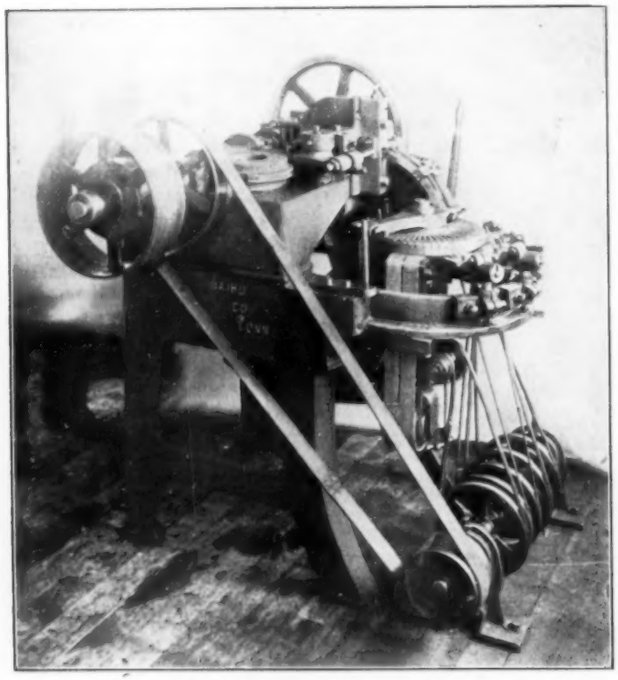


FIG. 2B. IRON PIN MAKING MACHINE.

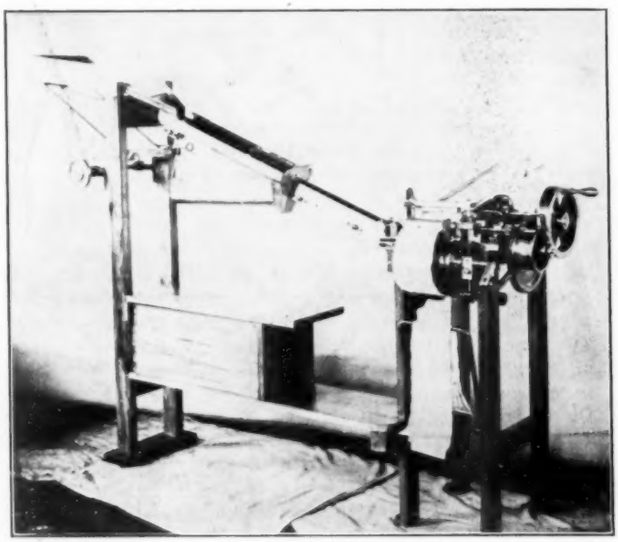


FIG. 3. PIN STICKING MACHINE.

CLEANING AND ANNEALING "MONEL METAL"

VALUABLE FORMULAE FOR USERS OF THIS REMARKABLE METAL.

In pickling "Monel Metal" it should be kept strongly in mind that the scale is a mixed oxide of copper and nickel so that its solution puts copper in the bath and also that "Monel Metal" has the property of cementing copper just as iron does. The cementation or "coppering" is prevented by the pickle methods described, but care should be taken to keep all iron pins and bars from any continued contact with the "Monel Metal" and no iron bands, wires or fasteners should be used. During pickling part of the scale is dissolved and the rest remains adherent to the metal, so that the progress of the pickling should be observed by removing a piece of metal from the bath and washing with a jet of water or rubbing with a piece of waste. When the scale becomes loose so that it may be easily rubbed off, remove the metal and wash it with a jet of water or scrub with a brush to remove the adhering scale.

Pickle Solution No. 1.—Make a solution of 1.1. specific gravity hydro-chloric acid. Keep this at about 120 degs. F. by injecting steam. To this add finely ground ferric iron oxide to prevent coppering. An excess of ferric oxide should be kept present at all times and the results are largely dependent upon the fineness of this oxide. If the "Monel Metal" should begin to copper it is an indication that there is not enough ferric chloride in solution and more ferric oxide should be added and the solution thoroughly agitated.

Pickle Solution No. 2.—Use a solution of ferric sulphate at about 100 to 130 degs. F., keeping it hot by the injection of steam. The strength of this solution depends upon the results desired. Since a strong solution gives more rapid pickling, but also a much heavier pickle consumption and increased metal loss. It must be thoroughly understood that it is *ferric* sulphate that is necessary and not *ferrous* sulphate or copperas. Anneal at 700 degs. C. or slightly above. It is not necessary to hold the metal at that temperature any longer than is necessary to heat it through thoroughly. The annealing effect is independent of speed of cooling. After the metal has been once brightened by a pickle it is advisable to charcoal anneal it from there on so as to save the labor and expense of further pickling. No. 2 Solution is the more effectual. No. 1 Solution can be used to good advantage with wire, however.

PRODUCTION OF SPELTER IN 1913.

The United States Geological Survey has issued a bulletin by C. C. Siebenthal, which gives the following figures as to spelter production in 1913:

	1912.	1913.	Change in 1913. Quantity	%
Production of primary spelter[1] in the United States	338,806	346,676	+ 7,870	2.3
Consumption of primary spelter in the United States	340,341	295,370	—44,971	13.2
Production of spelter in the world	1,070,045	1,103,359	+33,314	3.1

The figures of spelter production in this report do not include the zinc content of zinc pigments produced during the year.

[1] Primary spelter is made directly from ore, but secondary spelter is recovered from such sources as drosses, skimmings, and old metal.

GETTING ON A PAYING BASIS

A Story of How Scientific Management Was Put in Action in a Declining Business.

By I. M. Wyse.

The new general manager was due to arrive about January 1. Word had preceded him throughout all the plant and everyone was making ready to try out the newcomer to his own satisfaction. Cartoons were to be seen in the drawing-room showing the sure and sudden downfall of the manager to be, many were the consultations of the heads of departments with reference to the new man, and often that green-eyed monster jealousy seemed to be the chairman of the meeting, many cutting and even insulting remarks were made to the "Old Man" who had seemingly erred in choosing a new manager. Don't we know how to manage our departments? Do you think that guy will ever be able to learn the great variety of work here? Are not we worthy of promotion? Haven't we made you what you are?

Richelu, cool and sincere in all his doings, simply replied to all these remarks: "I am doing just what I think is best for us. If you are to have jobs here much longer new organization must be instituted, a live man is needed here. Cost must be reduced, system must be simplified and better service must be accorded our customers, and I believe a new manager to succeed myself will be putting of new blood and energy into our work." The "Old Man" had long foreseen that his lax methods, his inability to keep pace with the time, his coming old age, his irritableness, and his desire for ease were simply a menace to his business, and also a menace to those who depended on him for daily bread, but now the inevitable had to be considered—the new manager would soon be here. Would the heads of the departments leave, strike or what not?

The following Monday morning at the regular time, 7 a. m., all machines were going same as at previous times, every one seemed to be at his post. The "Central Girls" were busy answering—"Number, please." The great "Corliss" panted away with its usual head on. The old style furnaces in the foundry were illuminating the space about. The errand boys were running about with their merry whistle, and the heads of the departments were dispatching their orders as usual, in fact, no one seemed to know that the expected was so near at hand, when about 8:30 the "Old Man" and a stout square built young man of thirty stepped into the general office; quietly and noticing no one they proceeded immediately to Richelu's private office. It seemed an unusually long morning to the most of the office force, the "Old Man" had not been much in evidence and few cared to make much inquiry of him. for it was being whispered about: "Perhaps that is the 'New Guy.'" At 2:30 the same two returned together and proceeded to the private office, and the same quietness prevailed.

Suddenly it occurred to James Smith that he had an appointment with the manager at 3 p. m. concerning an order being held in the sales department. James was head of the sales department, but like many of his kind, he had not grown out of that stage of helplessness. He would not shoulder a responsibility, for he said he did not receive enough salary. James was admitted to the private office and was unceremoniously made acquainted with Mr. Vangol, the new manager. The keen eye, the jovial, hearty laugh of the new manager made a good impression on James, and when the order was brought up for discussion James found the new manager thoroughly versed with just such conditions as he needed light on, and left at once and passed the word that the "'New Guy' is a 'crack-a-jack.'" It was but a few moments later when the purchasing agent came in to have his purchasing orders O. Ked. He had bought foundry supplies, whereupon Mr. Vangol inquired of him his knowledge of foundry equipment, and whether the superintendent and foundry foremen had been consulted on this purchase, which brought out the fact that the buying department was a one-man affair, and without regard for the opinions of the practical men in the factory. Mr. Vangol noted this condition at once, and soon began to make investigation along these lines. Are all these departments one-man affairs?

The next week the "Old Man" and Mr. Vangol spent considerable time in walking through the departments noticing the work and meeting heads of the departments. Mr. Vangol was not received pleasantly by all the heads of the departments, in spite of the fact that a good word had preceded him from James Smith. He was the recipient of many unkind looks and some rebuffs, but his manly and intelligent appearance commanded the respect of most of the best men. The factory superintendent took to him at once, for he believed that with a new and progressive manager better equipment could be had, and better results obtained. During the past week through observation and conference with the heads of the departments Mr. Vangol had noted a great many weak spots in organization, so he resolved to spend some time in planning and submitting plans, and conferring with Mr. Richelu, so during all the week the two were to be found in the private office planning, making charts, describing organization and making system, when at last the following plan was decided on: (See chart.)

For several weeks Mr. Vangol spent most of his time studying conditions as they were and talking organization to the heads of the departments, pointing out that through better organization only could better pay, shorter hours, and better conditions be had. He succeeded in convincing many of these facts and educating them to a higher plane of work, and the following week the first time in the history of the institution a meeting of the heads of the departments was called, at which a banquet was given in honor of the new manager. Many dignitaries from the city were present to appear on the programme, and also the editor of the Daily News came, who took notes and had much to say for the new manager and the future of the Billings house and Ford company. The foreman and the heads of the departments met and discussed their daily affairs as never before, there was much of glad hand-shaking, and a new turn seemed to be at hand. Everyone was interested in doing something to make the business go better. Much informal discussion was had, and many of the foremen met for the first time on a fellowship basis; some had not had so much as a speaking acquaintance.

The meeting was called to order by Mr. Richelu, and all proceeded to share in the festivities of the evening, during which time many friendly toasts were offered and were well received. When the banquet was finished Mr. Richelu announced that inasmuch as everyone knew the purpose of the meeting, it gave

him, as well as the stockholders and officers of the company, great pleasure to be able to say that a new and competent executive had been secured as his successor, on whom he would thrust the responsibilities of future developments of the concern—"one who has had wide experience, having worked himself as a bench and lathe hand, who studied, worked hard, and progressed with progress of work, one who desires to lift and help the man who works and who appreciates help, one who is sincere, kind at heart, and ever ready to hear your complaints patiently, one who will help you to greater success, and who, I shall say now for

Vangol had had drawn on a black-board his plan of organization, and turning to this he talked of the duties of the different department heads from highest to the lowest, describing at some length the progress of the business. And then told how he had planned to begin immediately reorganizing and systematizing the producing end of the business. He also told how he desired to place under one charge all the tool makers that were being used in different departments, likewise all pattern makers would be put in one department and under one charge, all assemblers would be put in a department to themselves, likewise all finishers, drill-

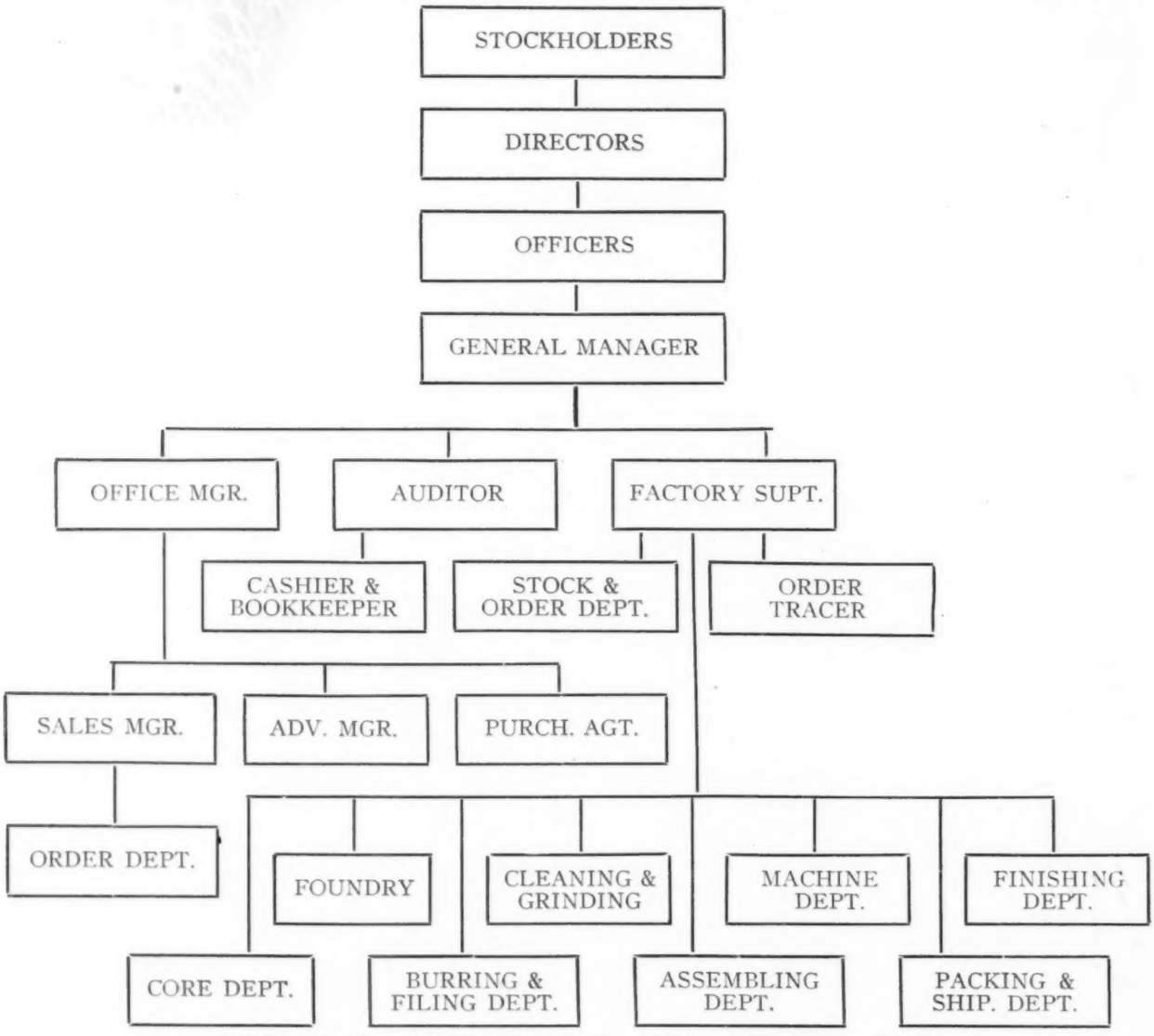


CHART SHOWING HOW THE NEW MANAGER PLANNED TO RUN THE BUSINESS.

him, asks your hearty co-operation. I now take pleasure in introducing to you my successor, our new general manager, Mr. Vangol." Mr. Vangol proceeded at once to talk system and his previous experience soon spoke itself, and everyone was much concerned about the many changes that would certainly take place. One of his first remarks was that no man's job would become smaller with new organization, but should grow better and larger. Many fears were at once removed and many hearts grew stronger.

press workers, grinders, polishers, buffers and platers would each be put in a separate department and under separate heads, each department would be equipped with an electric enunciator system whereby each man would notify his foreman for a new job one-half hour before he had finished. That a tool system be organized whereby all tools would be delivered to the man at the machine ready for operation, thus preventing great loss of time on the part of the foreman and the machine hands. The oil-blast furnaces should re-

place the old coke-furnaces, that an experimental department would be instituted, which would help to reduce cost by making experiments and tests to prove the efficiency of new tools, patterns and general equipment. And by going into much detail he explained how he believed that within a year hours could be cut from ten to nine without reducing pay, and without reducing the output. Much applause came from the foremen as he took his seat, and many were the expressions of satisfaction. The Mayor followed by saying that he was very glad to know that such a man and such an organization was on foot in his city, and he believed that he saw only unlimited opportunities for the faithful and those who would co-operate. The editor of The Daily News when called upon to give his views on the subject simply remarked that the morning paper would have an extra edition. Read it!—Adjourned.

RAPID AND BRIGHT SILVER DEPOSITS BY USE OF CARBON BISULPHIDE

A Few Suggestions as to the Function of This Popular Reagent in Silver Plating.

By Charles S. Barbour, Jr.

While most platers are familiar with the use of bisulphide of carbon as a brightener in silver plating, especially on cheap work, many do not realize the full value of it in heavy deposit. As the amount of metal deposit in a given time is in direct proportion to the amperage used, and too great an amperage results in a hard or burnt deposit, it stands to reason that the introduction of a material to the bath, which will enable the plater to use a greater amperage without causing a bad effect to the deposit, will result in a heavier deposit in the same time or the same deposit in less time. As an example take a silver tank for hollow-ware 6 feet long, 30 inches in width and 36 inches in depth, an average batch would consist of eight coffee pots or their equivalent. Allowing 50 grains to the pot (the average plate on Britania-ware) this would call for 400 grains, which at 20 amperes would require a 20 minute run.

If in the average silver solution consisting of 4 ounces of metallic silver, and 8 ounces of free cyanide per gallon, under above conditions more than 20 amperes are used, tips of spouts, exposed portion of handles and feet will have a gray sandy deposit and the body would cause considerable trouble for the burnisher by reason of the hardness of the deposit. If instead of burnishing, the body was to be buffed, the hardness of deposit would result in the greater portion of silver being removed by the buff before a satisfactory finish was secured. However, if bisulphide of carbon is correctly added to the bath, the batch can be run as high as 40 or in some cases 60 amperes, the work coming out in splendid condition, no nipping on exposed portion and with a skim milk color. This burnishes and buffs well. The average loss of silver on pots by buffing being only 3¼ per cent. (while from the plain solution the loss averages from 7 to 8 per cent.); also the time of buffing is much less.*

By referring to the chart published on page 332 of The Metal Industry, November, 1907, it will be seen that
20 minutes at 20 amperes gives 402 grains deposit;
10 minutes at 40 amperes gives 402 grains deposit;
6½ minutes at 60 amperes gives 409 grains deposit;
so that if the plater runs his batch at 60 amperes instead of 20 amperes he is able to turn his work out in one-third the time.

Now a word as to the saving in installing equipment.

A tank 6 feet by 36 inches will cost in the neighborhood of	$150
300 gallons of solution and 4 ounces of silver equals 1,200 ounces of silver at 56 cents, equals	672
Free cyanide of potassium	33
Time in making solution, cyanide in combination, acid, etc.	30
16 anodes 50 ounces each equals 800 ounces at 56 cents equals	448
Ammeter	18
Rods, wiring, etc.	10
Cost of equipping tank	1,361

As we can save the cost of two tanks out of every three by the adoption of this method of running silver solutions, it would result in the saving of $2,722 on each battery of three tanks, to say nothing of the indirect saving in floor space, time in walking to and from tanks while striking up batch. The method of making a brightener is as follows: Fill a 10 pound bottle half full of old silver solution and 10 ounces of cyanide of potassium and one pound of C. P. bisulphide of carbon, shake well and put in dark place (as light decomposes it), shake well every hour or so for about three days, leaving cork loose, as considerable gas is evolved. At the end of the third day carefully decant off clear solution, adding ½ ounce of it to every 100 gallons of silver solution and stirring after each batch. Repeat dose until deposit comes out a skim milk color. If more than this is added to the solution, the work will come out extremely bright, and while hard to burnish will buff very easily. Care must be taken to use not too much of the brightener or the solution will be spoiled. The first bottle can be refilled with solution and cyanide as long as there remains any of the bisulphide of carbon undissolved.

While nickel, brass and cyanide of copper solutions can be both hastened and brightened by similar methods, so much depends upon the class of work plated, conditions of solution, etc., that the writer feels it unwise to lay down any general rules for the same. However, if any of the readers of The Metal Industry are interested in any of these solutions and care to write to me in care of The Metal Industry giving size of tank, amount and character of work plated, distance from anodes, approximate square inches of surface, amperage, voltage, etc., included, formula used, the writer will be pleased to give any information they may require along these lines.

*The Neglected Ammeter in Silver Plating.

CANADA ALUMINUM EXPORTS.

The exports of metallic aluminum from this district in 1912 were valued at $1,107,425, against $432,600 in 1911, the large increase being due to accumulations of aluminum stock since the panic of 1907-8. The daily output of the factory at Shawinigan Falls, Quebec, is 40,000 pounds of crude aluminum, only a small percentage of which is consumed in Canada, the bulk being exported to England and Europe. The exports to the United States are merely for the purpose of having the metal rolled into rods at Massena, N. Y., the product being returned to Shawinigan Falls to be used in the manufacture of wire and cable. It does not pay to install rolling mills here for the small Canadian business. Some of the ingot is also shipped to New Kensington, Pa., and to Niagara Falls, N. Y., to be rolled into sheets and returned to Canada to supply the Canadian trade. The Canadian trade is too small to warrant the establishment of sheet rolls here.

VANADIUM IN BRASS

Some Results of Experiments in Using This Metal as a Deoxidizing Agent.

By O. F. Hudson, M.Sc., and R. Dunn, M.Sc.

A meeting of the Birmingham Section of the Institute of Metals was held at the White Horse Restaurant, Congreve street, Birmingham, England, on Tuesday, January 20, when a paper was presented on "Vanadium in Brass," by Messrs. O. F. Hudson, M.Sc., and R. Dunn, M.Sc.

Mr. Hudson, in presenting the paper, which was illustrated by an admirable series of limelight views, introduced it with some general remarks on special brasses. Small quantities of other metals were often intentionally added to copper zinc alloys in order to produce brasses having special qualities and which bore the general name "special brasses." The metals most commonly so used were tin, lead, iron, manganese, and aluminum, giving "naval brass," "delta metal," "manganese bronze," and many other well-known alloys. Vanadium was also now used to some extent, and was added in the form of cupro-vanadium, the resulting alloy being known generally as "vanadium-bronze." The majority of "special" brasses contained about 55 to 60 per cent. of copper and sometimes less, the one or more added metals replacing part of the zinc. The mechanical properties were superior to those of the corresponding ordinary brasses, at least in regard to tensile strength. The elastic limit also was usually raised, and the alloys were harder. At the same time, the ductility was usually sufficient for the purpose to which the brass was to be put. In addition, many special brasses were of particular value owing to their power of resisting corrosion. Tests of vanadium brasses indicated that the use of cupro-vanadium gave considerable increase of strength, and it was also stated that it much reduced the tendency to corrosion. The author exhibited a number of tables, compiled from tests carried out by previous investigators, and attributed the increases of tensile strength and elongation to the presence of small quantities of vanadium. The work which the authors of the paper carried out was designed to ascertain if small percentages of vanadium had any effect on the constitution and structure of copper-zinc alloys.

Professor Carpenter ascertained that a very prolonged annealing at a temperature just below the critical point was required before any structural change became visible under the microscope. Subsequently, in testing the effect of other metals in this critical point he found that about 1 per cent. of vanadium caused the complete structural resolution of the Beta into Alpha and Gamma at ordinary rates of cooling. That was an important point, as it would indicate a possible danger in adding anything more than a very small percentage of vanadium to brass. Dr. Carpenter's results were obtained after annealing ten weeks at temperatures just a little below the critical point. In order to make up a series of vanadium brasses, the authors obtained two separate samples of cupro-vanadium, but in each case it was found that other metals, particularly iron and aluminum, were present in such quantities that it was not possible to make from them copper-zinc-vanadium alloys in a state of reasonable purity. Small quantities of the pure alloys were then made, using pure vanadic acid, with aluminum as a reducing agent. The alloys were carefully examined, both thermally and microscopically, and the effect of long annealing at 450 degs. C. ascertained.

Summarizing the conclusions arrived at by Dr. Carpenter, Mr. Hudson said it was decided that vanadium had little or no effect on the critical point in which they were specially interested; that the alloy did not decrease the structural ability of the Beta, and might possibly increase it. Generally speaking, annealing at low temperature appeared to have rather less effect on vanadium brass than on pure brass. It was probable also that the beneficial effect of vanadium was largely due to its de-oxidizing power; but in this and other respects it was difficult to estimate the exact effect of vanadium, owing to the comparative large amount of aluminum and other metals present in many samples of commerical cupro-vanadium, and, of course, there was still the question of whether, supposing the beneficial effect was largely in de-oxidizing the same results might not be better obtained by some cheaper material, and that seemed to be a very suitable point for discussion.

DISCUSSION

The president, in opening the discussion, said they had listened to a most informing paper representing an enormous amount of research. The great difficulty was to obtain a pure vanadium to begin with, because they usually found that the impurities were at least equal in amount to the vanadium itself. His only regret was that the conditions did not allow of the production of larger quantities of the alloys, so that mechanical tests could have been made, and the results set out side by side with the products of the microscopic and thermal examinations. They had at present no evidence that the material used by Professor Carpenter was any more pure than that with which Mr. Dunn and Mr. Hudson commenced their experiments, and if that were so it was quite possible that the earlier results might be modified, or perhaps vitiated, by the effect of a certain amount of aluminum present. As the matter now stood, it could not be claimed that the addition of vanadium to brass carried any very great advantages, although experiments on a larger scale, and with mechanical tests might modify that conclusion. Its effect upon steel had been so pronounced that naturally a great deal had been expected of it in other directions.

Mr. Lantsberry complimented Mr. Hudson on the remarkable nature of the photographs. The point of great interest was that the effect was largely due to de-oxidation. It was worthy of note that cutting tools had become almost non-ferrous, and they had met with metals which, although free from iron, were superior to the best high-speed steel in cutting power.

Mr. F. Johnson said that while he was enormously interested in the paper he was disappointed in not learning something of the mechanical properties resulting from the application of vanadium to the Alpha and Beta brass so largely used in Birmingham trades. His own experience certainly confirmed the view that Vanadium acted as a scavenger upon copper, provided they used just enough to remove the residual oxygen, and to that extent they would produce a sounder brass. He would like to know whether Mr. Hudson considered that there was a chemical compound formed corresponding to $Cu_3 Zn_3$ because, if it were so, then a certain amount of zinc could be held in solid solution. He did not know whether Mr. Hudson had any experience of manganese bronze, but generally it was rather more brittle than Muntz's metal. He thought that Mr. Hudson had brought out an exceedingly important point in showing that pure vanadium did not alter the structural stability of the Beta phase. He would like to know whether Mr. Hudson knew of any means of separating material by the selective action of re-agents, and whether it would be possible to dissolve away the slag material shown in some of the photographs.

Mr. Sheppard said that he had made some experiments as to the practical use of vanadium, in the form of cupro-vanadium. He did not agree that there was no ill-effect, because the effect on the cost was very bad. He believed they paid for their experiment something like 8s. 6d. per pound.

and that meant that if they used only 1 per cent. that was going to put up the price a penny per pound—a very serious consideration, in view of the slight results. Several of the figures given by Mr. Hudson with regard to the strength of Muntz's metal were much too low. It was very desirable that experiments should be made with some standard length. He was bound to say that when they used vanadium with 70-29-1 metal the result was that it came very clean, which clearly showed that it had a good scavenging action.

Mr. Spittle said that, having made some experiments with vanadium, in regard to 70-30 brasses, the effect was nil. Possibly the impurity of the vanadium had something to do with it, but he was of opinion that it was less effective than some other alloys he had used for deoxidizing purposes.

Mr. P. M. Thompson recalled an experience he had in connection with the Non-ferrous Exhibition, held at the Agricultural Hall, London, in 1912. He received certain enquiries from representatives of a large firm in London, who wished to improve their metal, which was proving very low in tensile strength and elongation. A number of firms in the exhibition specialized on that subject, and he took the gentleman seeking information to the International Vanadium Company, who recommended the use of a new alloy, named "Cantor," which they had just placed on the market for the purpose of improving copper and brass castings. Some of the alloy was bought, and experiments were made with 2 per cent. of "Cantor," which it was found did not increase the tensile strength. Then he used ¼ per cent. and his tensile strength went up. It was claimed that this alloy acted as a scavenger and gave greater density to the casting. By the use of ¼ per cent. the tensile strength was increased from 8 tons to 15 tons. That clearly showed that large quantities were not necessary, and further experiments had confirmed the earlier results.

Mr. H. I. Coe, speaking of the scavenging action of vanadium, said he would like to know what evidence there was that the vanadium was the agent. Why should not the effect be due to aluminum, and would not magnesium, which was much cheaper, do the work equally well? There was a strong probability that these alloys, introduced for various purposes, were impure. For example, it was quite possible that cupro-manganese contained a good deal of iron, and by using purer materials they would get better results.

Mr. Hudson, replying, said he must apologize for the absence of mechanical tests, but he had been unable, through lack of time, to carry them out. The work done was preliminary to the important question of mechanical properties. It appeared to be the general opinion, from the discussion, that the action of vanadium was a deoxidizing action, and that was a conclusion to which the authors had already come, though it was quite true that, with other elements present, it was difficult to say how much of the effect was due to those other elements. He quite agreed with Mr. Johnson that the material was a true chemical compound, which might be conveniently formulated as $Cu_3 Zn_5$. Several attempts had been made to get rid of the slag patches, but without much success. He was inclined to say that the patches were probably vanadium in an oxidized form. With regard to Mr. Sheppard's remarks about the tests, the latter were merely copied from a series given in a paper at the Franklin Institute by Mr. Norris about two years ago. In cases where 5 per cent. of vanadium was desired, it was necessary to put in considerably more than that, to allow for losses due to general oxidation.

The president remarked that with regard to the existence of the chemical compound named, he attached much greater importance to the hardness test, and they would notice there was a very high peak. He should take the hardness test as conclusive evidence of the existence of the chemical compound, and thought it quite possible that the existence of the blue material in the photographs was due to the combination of infusible vanadium and zinc. Mr. Hudson said he quite agreed that there was a compound, but it was probably hardly safe to call "Gamma" by the name given to the compound, because Gamma had a comparatively wide range of composition, and it was quite true that vanadium was extremely infusible.

FACTORY ILLUMINATION

How a Lighting Problem Was Satisfactorily Solved.

By Guion Thompson.*

The average workmen about a factory are possessed of the idea that the artificial illumination of the shop is very poor unless there are numerous glaringly visible lamps hanging about. They usually consider the illumination especially good if there are plenty of portable lights that they can arrange to hang directly in front of their faces. In other words, they gauge the quality of the illumination by its blinding capacity and it is a hard matter to overcome this erroneous and harmful opinion without creating a large amount of discontent. A successful method of overcoming such prejudice will be given.

In artificial illumination, as in all matters that involve expense, the object to be obtained is best expressed by that much abused word, efficiency. To be efficient in a monetary sense it must be efficient in a physical sense and the efficiency of illumination in a physical sense means that the eye must observe easily and with the least fatigue, that which it is required to see. Physical efficiency does not always mean financial efficiency, but in this case it does, because the cost of light compared to the cost of labor is small and anything tending to tire the eyes or make seeing difficult will increase the labor expenditure to a value many times greater than the cost of illumination required to cure the defect in visibility.

An example of the detrimental effect produced by a common arrangement of lights may be seen by watching a machinist operating a machine in a shop illuminated by a large number of incandescent lights, each hanging over a machine, vise, or in a row over the benches. The operators are continually dodging their heads this way and that to escape the reflection from the work of the light from a lamp which they have hanging within a few inches of it. The intensity is high on the illuminated parts and the shadows deep on the dark sides of the work. If you will look into the workman's eyes you will notice that the pupils are contracted to fine points by the strong light. The same thing is noticeable in the eyes of a person looking across a room in which many lamps are visible. If he will close his eyes or look into the dark for a moment, his eye pupils will distend and then on looking back at the work or into the lighted room the first impression is that of extraordinarily fine illumination. Almost instantly that impression fades as the eye pupils automatically contract and he begins to squint and to hunt for advantageous positions in order to see this or that object. Nature, in protecting the eye against the glare of the lamps, makes it impossible for that eye to benefit by the intensity of the light on the object under observation.

Take the case of the room with the many visible lamps and put shades over these lamps that hide them from the observer's view and yet distribute the light symmetrically and the pupil of the observer's eye responds to the removal of the glare by opening, and objects in the room become much more distinct, though there is exactly as much light

*Consulting Engineer, Waterbury, Conn.

in the room as there was before, and though the workman will exclaim that "there is not half as much light as there was before." It is true almost without exception that people look for the lighting source and not the illumination of the work or the room when criticising an illuminating equipment. The same men base their opinion of a machine on its ability to turn out good work. The appearance of the machine is not so important as what it will do. When it comes to artificial lighting these very men are impressed more with the lamps and the amount of glaring light they produce than they are with the visibility of that which the light is intended to make visible.

In order to overcome this peculiarity and successfully install a good illuminating equipment in shop or factory, it is best to leave the old equipment as it is and install and put into operation the new and then remove the old, as it is naturally discarded by the operators, as in preparing their work they unconsciously find it is not needed. This fact was impressively proven in an installation made by the writer. It was a manufacturing plant producing an infinite variety of small metal products. The old installation consisted of hundreds of incandescent electric lamps, hanging from four to six feet above the floor, some shaded when directly in front of the operator's face, and the others left without shades in order that "they might light the room." The result was a blinding sheet of light about on a level with one's head.

The new installation consisted of high efficiency (tungsten) incandescent electric lamps, hung about ten feet above the floor, in bowl shaped metal reflectors the rim of which comes down to the level of the bottom of the lamp bulb, so that as one looked down the room none of the lamps were visible. The spacing was so proportioned to the height that the intensity of the light at three feet above the floor was practically the same in all parts of the room, and was in the neighborhood of two-foot candles. All the old lamps were removed, the old sockets being left so that such local lights here and there could be put back as might prove necessary, it being understood that there are always cases when such a light is necessary in order to produce an upward illumination for the purpose of tool-setting, repairs, examinations, etc.

When the new lights were switched on for the first time there came near being a panic. None thought of looking at their work—they all stared down the room and exclaimed at how dark it was—"Why, you cannot see a light," they would shout in exasperation. If you asked them to quit staring at the ceiling and look at the machines, at each other, at their work, they would give you a pitying look and want to know how you expected them to see anything when they couldn't see any light to see by. So each old lamp was put back and the new and old equipment used together, and peace was established. A month later in walking through the plant nearly all of the old lamps could be seen hanging in their sockets but not turned on. They gradually eliminated themselves. The old pendant sockets have never been removed, but today they hang empty and serve as handy connections for extensions used by tool-makers and machinists in working under a machine, etc. The shop is equally lighted in all parts. The workman sees anything in his hand, in the vise or in the machine without having to turn about or up or down in order to get in a certain position to catch the reflection from some local lamp. When he moves about the shop he is not turning on and off lights in order to see in his new location or to save lighting energy in his old location. And, as one looks down the room there are visible many operators and machines and few lights, as compared to many lights and few operators and machines in the old arrangement, while, as a matter of fact, there are just as many of each now as there were before. The only difference is that a better understanding of their relations to each other has been utilized. The total amount of current used in the shop for lighting is two-thirds of what it was before the change was made, and the difference in the cost of lighting bills, in nine months, paid for the change.

CHEAP SOURCE OF ALUMINUM.

A Brief Résumé of a Process Invented by Alfred H. Cowles for Producing Alumina as a By-Product.

The clay, carbonaceous matter and salt are made into perforated briquettes, and after being dried in a drying kiln, they are passed on flat cars through a long furnace of the tunnel type which brings the briquette to a temperature of about 1035° C.

Knowing the composition of the clay, and the percentage of salt in the mixture, steam is blown into the discharge end of the furnace over a train of cars covered with firebrick, with their iron parts sealed off, while through a vestibule at the other end of the furnace, loaded cars are gradually pushed forward by a hydraulic pusher whose speed is under control. The weight and composition of the material on the cars thus fed into the furnace is known, and the correct proportional weight of exhaust steam is passed into the furnace from the opposite end. From the charging end, the gases at a temperature too hot to attack iron are sucked by a large blower and forced through a large hydrochloric acid condensing system. The temperature of the furnace is controlled by oil heat and measured by pyrometers. Most of the heat required is furnished by the carbonaceous material mixed with the clay and salt of the briquettes. The re-action that takes place will vary according to the composition and mixture of the aluminus material and the salt, but typically, the final re-action is as follows:

$$Al_2O_3\,2SiO_2 + 4NaCl + 2H_2O + \times H_2O + \times C + \times O = (Na_2O)_2\,(SiO_2)_2\,Al_2O_3 + 4HCl + \times H_2O + \times CO$$

The surplus vapor of water and the hydrochloric acid gas are carried into the condensing apparatus and are condensed. The briquettes maintain their original form as the cars bearing them are gradually pushed out of the discharge end of the furnace, having been cooled by the inflowing rush of measured steam and a limited quantity of air. The sodic-silico-aluminate briquettes formed have been made as high as 33% of sodic oxide. The above reaction would give 35.8% Na_2O. There is no appreciable loss of salt. While pure clays are preferred, all small amounts of iron pass off as iron chloride with the hydrochloric acid and are condensed with the first hydrochloric acid in the first condensers of a muitiple series system. The acid produced is remarkably pure, free from arsenic, and but traces of sulphuric acid can come from iron pyrite if the same be in the clay. When briquettes are made containing 32% of sodic-oxide, the output of 30% hydrochloric acid should be about one and a half tons of acid to one ton of salt and clay charged into the furnace.

The next step in this process is to open the sodic-silico-aluminate, which is acid, to secure from it the sodic aluminate which it contains. This is accomplished by heating a mixture of ground acid salt with just sufficient lime to combine with the silica in it and form di-calcium silicate.

$$(Na_2O)_2\,(SiO_2)\,Al_2O_3 + 4\,CaO = 2(CaO)_2\,(SiO_2) + (Na_2O) + Al_2O_3.$$

Limestone, calcite or marl may also be used.

STANDARD SIEVES AND SCREENS

AN ARTICLE DEALING WITH THE METHODS FOR DETERMINING THE VALUE OF ABRASIVES, PAINTS AND POLISHING POWDERS, ETC.

BY ANDREW M. FAIRLIE.*

With the improvement within recent years in the fine grinding of materials in certain industries has come a demand for more accurate sieves, for screening and sizing the manufactured products. With such materials as cement, abrasives, paint pigments, graphite, polishing powders, etc., it is recognized that the degree of usefulness is proportional to the fineness of the grinding; and in order to determine the fineness, during and after the grinding process, recourse is had to sieves. In addition, sieve cloth (or sieves) is used for filtering, in centrifugal machines, in ore dressing, in the manufacture of paints, varnishes, paper and flour, for screening the windows of buildings, passenger cars, etc., as a raw material in manufactured articles, in chemical laboratories, and in many other ways and for many other purposes.

In most of the uses to which wire cloth is put, it is important that the size of the openings should be reliable, accurate and uniform. By uniformity is meant not only that the sizes of all the openings in any one piece of sieve cloth should be the same, but that the openings in any two or more sieves or pieces of cloth claiming to have the same number of meshes to the linear inch shall be identical. Such uniformity can best be obtained by the establishment of standards by the Government and by adherence thereto by the wire cloth manufacturers. In this way, producer and consumer alike being required to test manufactured products by uniform standard screens, disputes may be prevented, and uniformity in grade of product may be maintained.

The United States Bureau of Standards has recognized the importance of the standardization of sieves, and has prepared specifications for standard sieves of 200, 100, 30 and 20 mesh, which were adopted by the Departmental Conference on Portland Cement Specifications, February 13, 1912. These specifications are as follows:

"Wire cloth for standard sieves for cement and sand shall be woven (not twilled) from brass, bronze, or other suitable wire, and mounted on the frames without distortion.

"The sieve frames shall be circular, about 20 cm. (7.87 in.) in diameter, 6 cm. (2.36 in.) high, and provided with a pan about 5 cm. (1.97 in.) deep, and a cover."

Details regarding the size of openings between wires, diameter of wires, and tolerable deviations from the standard, are shown in the following table:

				No. 200 Cement Sieve	No. 100 Cement Sieve	No. 30 Sand Sieve	No. 20 Sand Sieve
Width of opening, in.				.0029	.0055	.0223	.0335
Diameter of warp or shoot wires In.	Desirable.			.0021	.0045	.0110	.0165
	Tolerance. Av. of Wires Measured.		Min.	.0019	.0042	.0105	.0160
			Max.	.0023	.0048	.0115	.0170
Number of wires to 1 inch.	Warp Wires	Desirable		200	100	...	...
		Tolerance	Min.	195	98	29.5	19.5
			Max.	202	101	30.5	20.5
	Shoot Wires	Desirable		200	100	...	...
		Tolerance	Min.	192	96	28.5	19
			Max.	204	102	31.5	21
Number of wires in ¼ to ½ inch (expressed in rate per inch).	Warp Wires	Desirable		200	100	...	...
		Tolerance	Min.	192	95	...	...
			Max.	203	101	...	...
	Shoot Wires	Desirable		200	100	...	...
		Tolerance	Min.	190	93	...	...
			Max.	205	103	...	...

In the above specifications, twilled cloth is excluded chiefly because of the greater size and variability of the openings in twilled cloth as compared with plain woven cloth of the same mesh and wire diameter. Because of the structure of twilled cloth, the shoot wires may be displaced enough to increase the size of the openings 17 per cent.

The tolerances for the mesh of the warp wires are less than for the shoot wires (also called the woof, weft, or filling wires) because the former can be placed much more accurately and uniformly than the latter.

It is stated by the Bureau of Standards that while the weaving of cloth coarser than 100 meshes to the inch, and even of some of the 100 mesh cloth, is done in the United States, the finer meshed cloth is usually imported from Scotland, England, France, or Germany. It is stated further that no satisfactory power loom has been devised for weaving these cloths from small wires, and that hand weaving is therefore necessary.[1]

At least one manufacturing firm in the United States has announced its ability, despite the foregoing statement regarding necessity for importation, to furnish sieves not only of 100 mesh, but of 200 mesh and 260 mesh in plain cloth, and of 300 mesh in twilled cloth. The W. S. Tyler Company, of Cleveland, Ohio, while prepared to furnish standard sieves conforming strictly to the specifications of the Bureau of Standards, has not stopped at that, but has established a standard scale for the entire range of ordinary meshes of sieves, thus satisfying the demand for standard testing sieves of many different sizes, with openings of uniform and accurate dimensions for each size, which increase and decrease throughout the entire series of sizes in a fixed ratio. This firm asserts that in establishing this standard screen scale, and furthermore in manufacturing the cloth in accordance with the scale, they are of the opinion that something worth while towards the advancement of standardization in technical work has been contributed.

An essential element of this scale is that the openings between the wires shall be exactly square. And if this requirement be met, it follows that the number of meshes to the linear inch must be the same, whether measuring the length or the breadth of the weave.

The basis of this standard screen scale is the 200 mesh screen adopted by the United States Bureau of Standards, having an opening of .0029 inch, and made from wire of .0021 inch in diameter. Starting with this, throughout the entire series, the areas of the openings in the screens, advancing regularly from finest to coarsest, increase uniformly from one size to the next by the factor 2. Thus the areas of the openings in each sieve are exactly twice as large as those in the next finer sieve, and half as large as those in the next coarser. To secure this result, the widths of the openings, advancing regularly from the finest sieve to the coarsest, increase uniformly by the factor 1.414, which is the square root of 2, the factor for the areas of the (square) openings. This system of grading screens was recommended by Rittinger, in his work on ore dressing.

The following table gives, in accordance with this standard screen scale, for each of the common sizes of sieves, the width of the opening in inches and in milli-

*Copperhill, Tenn.

[1]For details of the methods of weaving wire cloth for fine sieves, the Bureau of Standards refers to: Proc. Am. Soc. for Testing Materials, 4, pp. 550-556, 1904: Clifford Richardson, "The Modern Asphalt Pavement," pp. 59-64.

meters; the so-called "mesh"; and the diameter of the wire, in decimal parts of an inch.

Width of Opening in Inches. Factor = $\sqrt{2}$ or 1.414	Width of Opening in Millimeters.	Mesh	Diameter Wire, Decimals of an Inch.
1.050	26.67	...	.149
.742	18.85	...	.135
.525	13.33	...	.105
.371	9.423	...	.092
.263	6.680	3	.070
.185	4.699	4	.065
.131	3.327	6	.036
.093	2.362	8	.032
.065	1.651	10	.035
.046	1.168	14	.025
.0328	.833	20	0172
.0232	.589	28	.0125
.0164	.417	35	.0122
.0116	.295	48	.0092
.0082	.208	65	.0072
.0058	.147	100	.0042
.0041	.104	150	.0026
.0029	.074	200	.0021

Inspection of the above table shows that this standard screen scale comprises eighteen sieves, ranging from

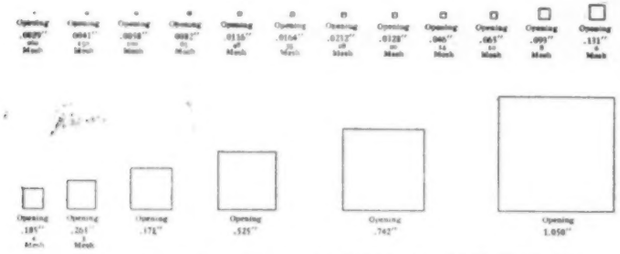


FIG. 1. SHOWING RELATIVE SIZES OF OPENINGS OF STANDARD SCREEN SCALE.

.0029 inch in width of opening (200 mesh) to an opening 1.05 inches in width. By comparing this table with the requirements of the United States Bureau of Standards (see above) it will be seen that the 200 mesh screen, the basis of the system, complies with the specifications of the Bureau; that the 100 mesh screen likewise complies with those specifications as regards diameter of wire, the width of the opening, however, being .0003 inch too large; and that in the 20 mesh screen, the size of wire exceeds the maximum limit prescribed by the Bureau by only .0002 inch, while the width of the opening is .0007 inch smaller than the minimum specified by the Government. In this standard screen scale there is no 30 mesh screen, to correspond with the fourth size for which specifications have been given by the Bureau of Standards.

The relative sizes of the openings of the above standard screen scale are shown drawn to scale below (Fig. 1), as accurately as is possible by means of printer's ink. The finest sizes are too small to be shown accurately in this way, but the illustration will give an idea of the relative sizes, even of the smallest openings.

For still closer work in sifting materials, the aforesaid company is prepared to furnish screens with openings intermediate in size between the openings of: (1) the 200 and the 150 mesh; (2) the 150 and the 100 mesh; and (3) the 100 and the 65 mesh screens. The openings in a set of screens thus completed will increase in width, advancing regularly from the finest sieve to the coarsest, by the factor 1.189, or the 4th root of 2, as recommended by Prof. Richards. The table representing the standard screen scale, thus completed, will read as follows:

Width of Opening in Inches. Factor = $\sqrt[4]{2}$ or 1.189.	Width of Opening in Millimeters.	Mesh.	Diameter of Wire, Decimals of an Inch.
.0082	.208	65	.0072
.0069	.175	80	.0056
.0058	.147	100	.0042
.0049	.124	115	.0038
.0041	.104	150	.0026
.0035	.088	170	.0024
.0029	.074	200	.0021

This standard screen scale, especially as amended by the interpolation of the three extra screens of intermediate size (170, 115 and 80 mesh) has much to commend it. The Bureau of Standards, however, suggests that "the openings of such a series of sieves should vary in such a way that the squares of the width of the openings should differ by equal amounts." It is assumed that such a constant difference would be obtained by substracting the area of the (square) openings in any screen from the area of the openings in the next coarser screen. Such a system would lead either to a very numerous series with unnecessarily fine gradations in the coarser sieves, or to a series containing a reasonable number of units, whose degrees of difference among the finer sieves would be far too great for many purposes.

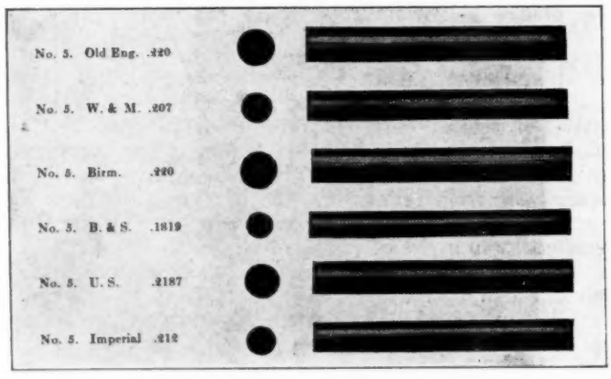


FIG. 2. SHOWING DIFFERENCE OF SIZES OF SIX WIRES, ALL THE SAME GAUGE NUMBER, ON SIX WIRE GAUGE SCALES.

There is a commendable tendency among manufacturers of screens to emancipate themselves from the use of wire gauges in expressing the diameter of wires. If there were only one standard scale of wire gauge numbers, it would be convenient to designate sizes of wires by those numbers; but there are so many scales in common use, all different, that it is absolutely necessary, after stating a gauge number, to specify also by name the scale referred to. If the name of the wire gauge scale be omitted, confusion results. The illustration (Fig. 2) furnishes an example of the difference in the sizes of six wires, all the same gauge number, but so designated according to six different wire gauge scales.

It will be noted that the diameters of the wires range from .1819 to .220 inch, and that only two of the wires (those referring to the Old English and the Birmingham scales, respectively) are alike in size. But even the Old English and the Birmingham scales do not give identical sizes for all gauge numbers.

On account of the confusion, therefore, resulting from the use of wire gauge numbers, it is highly desirable, in the manufacture of standard sieves at least, where the size of the wire bears such an important relation to the size of the opening in the screen, that the use of gauge numbers be resolutely discarded, and that the diameter of all wires be expressed in decimals of an inch.

In addition to wire gauge numbers, the term "mesh" as applied to screens may be confusing and misleading. The important feature of a screen or sieve to the user is the size of the openings, or spaces between the wires, for that determines the sizes of separated particles of materials sifted. The number of meshes to the linear inch does not indicate the size of the opening, unless the diameter of the wire used be given also. For example, a 20 mesh screen made of .028 inch wire has an opening or "space" of .0220 inch in width, whereas a screen of the same mesh, made of .009 inch wire yields a space whose width is .041 inch. Again, a 20 mesh screen made of .020 inch wire has an opening .030 inch in width, and so has a 14 mesh screen made of .041 inch wire. If the term "mesh" be used at all, to make the description of the screen complete the size of the wire must be given as well.

The Bureau of Standards holds that the specification of sieves or sieve cloth by the size of the openings between the wires is not a practicable method of definition, either for the weavers or for those who measure the accuracy of sieves. The size of the wire and the number of meshes in a given distance each way are, rather, the easily measured quantities for manufacture and inspection of the cloth, the size of the opening between the wires being deduced from these two factors.

The foregoing summary of what has been done towards securing sieves and screens with openings of definite size shows that a fair start has been made in the right direction. Some of our manufacturers have proceeded farther and faster than the Bureau of Standards, which, so far, has issued specifications for only four sizes of screens. A definite system for the manufacture of standard screens covering a wide range of sizes, has been proposed, and screens claimed to be in conformity therewith are obtainable in the markets. It remains for the Bureau of Standards to sanction this system by adopting it as a standard, to amend this system and adopt it so amended, or else to adopt some other comprehensive plan, as the experience of the Bureau in such matters may dictate.

THE MICRO-CHEMISTRY OF CORROSION

Part I.—Some Copper-Zinc Alloys.

By Cecil H. Desch, D.Sc., Ph.D., and Samuel Whyte.

(Concluded from October, 1913.)

CORROSION EXPERIMENTS.

These experiments were conducted in the following manner:

A vertical wall of plasticine was built up around each specimen as usual, but a lip was formed so as to allow the solution to overflow just above the level of the platinum cathode, the liquid then flowing into a beaker. A burette containing 5 per cent. sodium chloride solution was then placed above the specimen, the liquid falling drop by drop at a constant rate. 100 cubic centimetres of the solution were used in each experiment, the time occupied being in one series 45 minutes, and in another one hour. The flocculent precipitate did not settle, but was continually washed over into the beaker, so that the surface of the specimens remained clean, with the exception of the alloy containing tin, which became coated with a tough, white layer, which exhibited deliquescence when dried and exposed to the air. The adherent metallic layer was peeled off for analysis. The results are collected in Tables VI, VII and VIII.

The figures in Table VIII show that the β-alloy quenched above its transformation point is corroded to a greater extent than the alloy which has undergone the normal transformation during cooling, and that, whilst tin greatly retards the corrosion, iron exerts a very conspicuous accelerating influence. These facts are discussed in greater detail below.

Table VI.—Composition of Precipitate.

Alloy.	Time. Minutes.	Milligrammes. Copper.	Zinc.	Tin.	Iron.	Total.	Per Cent. Copper.	Zinc.	Tin.	Iron.
I.	45	0.76	25.27	....	....	26.03	2.9	97.1	....	....
	60	1.20	29.98	....	....	31.18	3.8	96.2	....	....
II.	45	1.10	27.60	....	....	28.70	3.8	96.2	....	....
	60	1.25	32.58	....	....	33.83	3.7	96.3	....	....
III.	45	0.85	12.25	trace	....	13.10	6.5	93.5	trace	....
	60	3.75	16.00	0.06	....	19.81	18.8	80.9	0.3	....
IV.	45	3.25	29.45	....	0.38	33.08	9.8	89.0	....	1.2
	60	6.00	35.88	....	0.68	42.56	14.1	84.3	....	1.6

Table VII.—Composition of Adherent Layer.

Alloy.	Time. Minutes.	Milligrammes. Copper.	Zinc.	Tin.	Iron.	Total.	Per Cent. Copper.	Zinc.	Tin.	Iron.
I.	45	16.00	0.90	....	....	16.90	94.7	5.3	....	....
	60	27.00	0.34	....	....	27.34	98.7	1.3	....	....
II.	45	30.00	0.26	....	....	30.26	99.1	0.9	....	....
	60	36.00	0.14	....	....	36.14	99.6	0.4	....	....
III.	45	14.10	0.30	0.15	....	14.55	96.9	2.1	1.0	....
	60	17.50	0.83	0.18	....	18.51	94.5	4.5	1.0	....
IV.	45	22.00	0.15	....	0.025	22.175	99.2	0.7	....	0.1
	60	38.00	0.27	....	0.035	38.305	99.2	0.7	....	0.1

Table VIII.—Total Weight of Corrosion Product.

Alloys.	Milligrammes. 45 Minutes.	60 Minutes.
I.	42.93	58.52
II.	58.96	69.97
III.	27.65	38.32
IV.	55.25	80.86

MICROSCOPICAL OBSERVATIONS.

The alloys were found to present marked differences in regard to the alteration of appearance during corrosion. The adherent layer had the appearance of copper (except in the case of Alloy III., containing tin, which became coated with a white deposit, below which was the usual coppery layer). On detaching this layer and peeling, the crystalline structure of the alloy was generally clearly visible, and there was no continuity between the adherent layer, composed almost entirely of copper, and the unchanged alloy beneath. The only exception to this rule was observed after very prolonged etching, when the borders of the crystals were found to be affected as described on the following page:

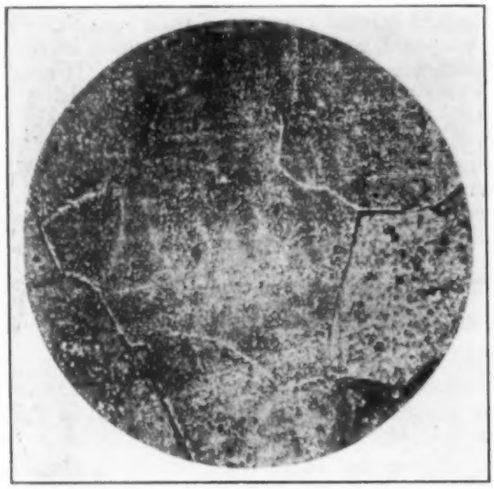


Fig. 1. Alloy IV. 5-minute Test. Adherent Copper Layer. Magnified 90 diameters.

The surface of the coppery layer shows, more or less distinctly, the outlines of the β-crystals from which it is derived. This effect is seen in Fig. 1, which may be compared with Fig. 2, representing a neighboring area on the same specimen, after the copper had been detached. After

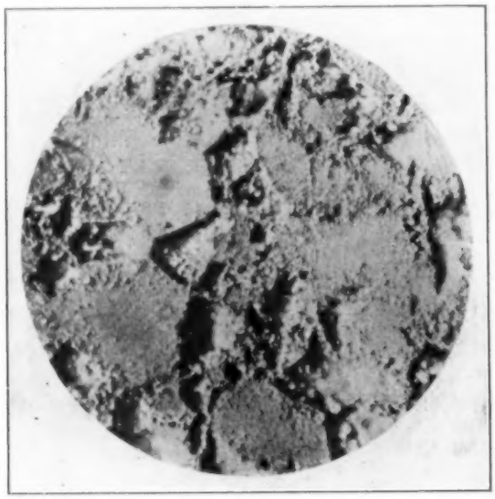


Fig. 3. Alloy IV. 1-hour Test. Adherent Copper Layer. Magnified 36 diameters.

the long period corrosion tests, the edges of the β-crystals could sometimes be seen in relief. This was especially the case with Alloy IV., containing iron, the copper-covered surface of which is seen in Figs. 3 and 4. In the latter figure, the boundaries form cellular walls in high relief. After stripping off the copper the crystals were found to have been very unequally attacked, as is shown in Fig. 5. The white areas in the photograph represent clean, glistening areas of the β-alloy, whilst the darker areas are considerably depressed below the surrounding surface, and more or less colored by adhering films of copper, which were not readily removed from these areas.

The readiness with which the film of copper may be detached is worthy of remark. The removal of zinc necessarily commences at the surface and proceeds downwards into the alloy. It might perhaps be expected that the proportion of zinc would diminish downwards in a continuous manner. This is not the case in any of the

Fig. 2. Alloy IV. 5-minute Test. Copper Layer Removed. Magnified 90 diameters.

alloys that we have examined. The removal of zinc is practically complete as far as the action penetrates, and there is no zone of intermediate composition uniting the copper and the unchanged alloy. In experiments shortly to be published by one of us, it is shown that a sharp

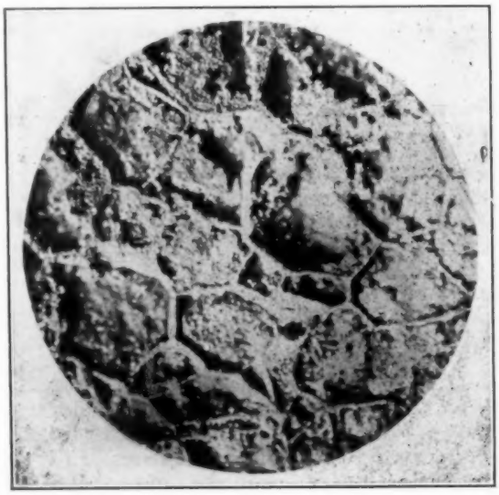


Fig. 4. Alloy IV. 1-hour Test. Adherent Copper Layer. Magnified 36 diameters.

boundary is characteristic of the diffusion process in solid solutions when accompanied by a chemical reaction, and the present results show that "dezincification," as it is commonly called, proceeds exactly in the manner of a diffusion process.

As the action proceeds, the crystalline structure of the alloy is laid bare. This is best seen in the Alloy I. composed of copper and zinc alone. Fig. 6 shows this alloy after corrosion for five minutes. The β-crystals are exposed in the same manner as after etching with ammonia or ferric chloride, differences of orientation giving rise to contrasts in the photograph. After longer corrosion, the inequalities of level are much increased, and the surfaces and edges of the β-crystals become deeply scored with

Fig. 5. Alloy IV. 45-minute Test. Copper Layer Removed. Magnified 65 diameters.

etch-figures, usually arranged in parallel lines. The general effect is seen in Fig. 7, although much detail is lost in the photograph, owing to the varying inclination of the etched surfaces to the incident light. Details of the etching are shown under a higher magnification in Fig. 8. Alloy I. was found to give the most regular etch-figures.

Fig. 7. Alloy I. 1-hour Test. Deeply Etched Surface beneath Copper Layer. Magnified 18 diameters.

There are several indications that corrosion begins at the boundaries of the crystal grains. On allowing the specimen to remain connected with the battery for several hours, and afterwards grinding away the surface layer and polishing, the crystals could sometimes be seen to be bordered by a distinct layer of copper.

DISCUSSION OF THE RESULTS.

The figures given above emphasize the importance, in experiments dealing with corrosion, of distinguishing between material which is actually dissolved (here included in the precipitate) and that which remains as a dezincified layer, which may afterwards become mechanically detached. In the absence of mechanical disturbance, this layer may serve as a protection against further corrosion, but if agitated, the layer may scale off from time to time,

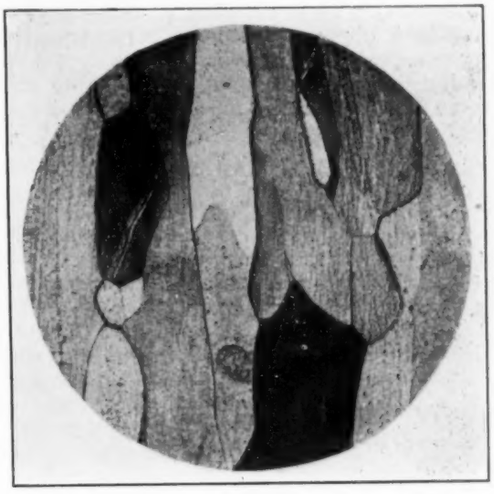


Fig. 6. Alloy I. 5-minute Test. Copper Layer Removed. Magnified 18 diameters.

exposing a fresh surface to the action of the corroding agent.

The removal of zinc from this surface layer proceeds until practically only copper remains. Up to 99.6 per cent. of copper has been found, and it is probable that a

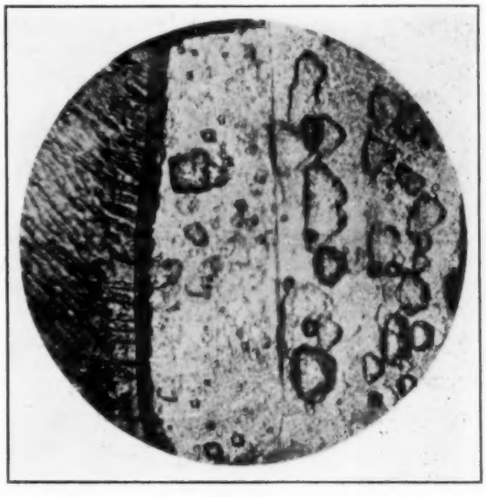


Fig. 8. Alloy I. 1-hour Test. Etch-figures due to Corrosion. Magnified 36 diameters.

part even of the small remaining amount of zinc is mechanically retained by the somewhat porous copper.

FROSTING METALS.

The sandblast, working on the same principle as the big outfits used to clean the stone fronts of begrimed city buildings, is now being applied to jewelry. By means of its delicate frosted appearances can be given to gold and silver, "satin finish" for silver being one of the results.

FOUNDRY NOTES AND FORMULAE

A Compilation of Valuable Data Relating to Foundry Practice, Together with Some Standard Metal Mixtures.

By Frank Zeller.*

Knowing the difficulties encountered by those seeking reliable information regarding brass foundry mixtures, the writer has condensed this work, using only such information as is required in every-day practice by busy men, eliminating complicated terms, lengthy explanations, and superfluous variety.

In advising these mixtures, both quality and cost are taken into consideration, and are consistent with the methods of today.

SYMBOLS.

Cu	Copper	P	Phosphorus
Sn	Tin	Si	Silicon
Zn	Zinc	Ag	Silver
Pb	Lead	Au	Gold
Al	Aluminum	Mn	Manganese
Sb	Antimony	Fe	Iron
Bi	Bismuth		

SHRINKAGE OF CASTINGS.

Aluminum = 1/4 inch per foot.
Brass = 3/16 inch per foot.
Cast iron = 1/8 inch per foot.
Lead = 3/32 inch per foot.
Tin = 1/16 inch per foot.
Zinc = 3/16 inch per foot.

To obtain approximate weight of brass castings from "white pine" pattern multiply weight of wood pattern by 20.

APPROXIMATE MELTING POINTS AND WEIGHT PER CUBIC FOOT OF METALS.

Deg. Fahr.	Metal.	Lbs. per cu. ft.
450	Tin	455
525	Bismuth	612
600	Lead	710
775	Zinc	436
842	Antimony	421
1,150	Aluminum	160
1,400	Yellow brass	525
1,650	Red brass	540
1,900	Copper	555
1,800	Silver	644
1,950	Gold	1,203
2,500	Iron	450
2,750	Nickel	550
3,200	Platinum	1,343
2,400	Manganese	499

TO CHANGE THERMOMETER READINGS.

To convert Fahrenheit degrees to centigrade, subtract 32, divide by 9, multiply by 5.

To convert centigrade degrees to Fahrenheit, divide by 5, multiply by 9, and add 32.

COPPER CASTINGS.

	Copper.	Silicon Copper.	Zinc.
High conductivity	99	1	—
Soldering irons, hammers, etc.	97	—	3

Note.—As pure copper absorbs oxygen in the air, which causes sponginess, it is advisable to use a small amount of zinc or silicon copper to produce sound castings.

Zinc lowers the conductivity for electrical purposes.

BRASS FOUNDRY ALLOYS.

	Copper.	Tin.	Zinc.	Lead.
Yellow brass, cheap, soft	60	—	36	4
Yellow brass, cheap, harder	62	—	38	—
Yellow brass, good	66	—	32	2
Yellow brass, standard	70	—	30	—
Yellow brass, strong and tough	68	1	30	1
Yellow brass, high grade, for fittings and pressure work	80	4	14	2
Gun metal, very strong, for gears, etc.; 1/4 of 1% aluminum; greatly increases tensile strength	88	10	2	—
Steam metal, hydraulic work	84	10	4	2
Steam metal, hard, for valves, discs, seats, rings, etc.	88	8	3	1
Excellent valve metal	87	7	4	2
Fine steam metal, for valves, cylinders, etc	88	5	3.5	3.5
Good, cheap valve metal	87.5	1	8	3.5
Cheap red metal, for ordinary castings	84	—	8	8
Brazing metal	86	—	13	1
Brazing metal, machines better	83	1.5	14	2.5
Anti-acid metal, also a good bearing metal	78	7	—	15
Anti-acid bronze	87	12	—	1
Good bearing metal, for car brasses, etc	80	10	—	10
Bearing metal	65	5	—	30

Note.—A small amount of nickel may be added to prevent lead sweat.

SCRAP METAL MIXTURES.

	Red Scrap.	Yellow Scrap.	Copper.	Zinc.	Lead.
Fine yellow	—	94	6	—	—
Common yellow	29	58	4	8	1
Good red	75	14	8	2	1
Common red	73	18	4	3	2

MANGANESE BRONZE.

	Copper.	Mang. Copper.	Tin.	Zinc.	Alumi-num.
Propellers, gears, bolts, etc.	6	56	1	36	1

Note.—Manganese copper contains about 70 per cent. of copper, 25 to 27 per cent. manganese, and 2 to 4 per cent. of iron.

PHOSPHOR BRONZE.

	Copper.	Tin.	Phosphor Lead.
Pistons, rings, etc., very hard	87	12	1
Good, for bearings	84	8	8
Very strong and tough	90	10	—

(To be concluded.)

*Superintendent Brass Foundries, Zarecke Manufacturing Company, Erie, Pa.

PUMICE STONE

SOME INTERESTING INFORMATION REGARDING THIS IMPORTANT COMMERCIAL PRODUCT.

BY WALTER C. GOLD.*

Pumice stone is of volcanic origin resulting from the solidification of foam or scum formed by the escape of steam on the surface of the molten lava, the best quality coming from Aqua Calda in the island of Lapari, which is practically a volcanic cone rising abruptly from the sea off the northeastern coast of Sicily. It is carried from the Pumice mines (controlled by the Municipality) on "Campo Bianca" mountain to the shipping point Canneto, Bay of Lapari, three miles away, on the backs of convicts in the most primitive fashion. Italy sends her convicts to work in the Pumice mines of Lapari from which there is no means of escape. There are no wharves at Canneto, consequently the pumice is carried to the steamers out in the bay by lighters. The shoreline is very marked and the water is very deep right at the shore line, indicating that the island of Lapari is a cone of a great volcanic mountain. Pumice stone is a peculiar, soft, spongy stone. There are, however, various degrees of softness, porosity, purity and direction of grain to this pumice rock. It is sharp and quite brittle, breaking readily under a light blow of the hammer and with a good fracture. The purest stone is exceedingly light in weight, a large cask weighing but 175 pounds, whereas the impure stone is weighted with iron and is less porous. In the arts, and commercially, Pumice stone has become quite an important commodity. The best lump qualities are used on lithographing stones and for finishing high-class carriage and automobile bodies and, too, goods manufactured from silver; also upon patent and enamel leather. It is extensively used for finishing granites and marbles. In ground form it is used in the manufacture of soap, and by metal finishers for scouring purposes before plating. The crude Pumice is called Pezzame, being full of iron, stones, sulphur and other deleterious substances. All these must be removed before the Pumice stone can be ground, else it would be useless commercially.

Briefly stated, the method of grinding and grading is as follows: After being crushed by the old fashioned burr-stone mills it is carried by a bucket elevator in the pumice factory to large hoppers in the roof and from there it runs automatically into mills. From the mill it drops into the steam dryer; from the dryer (here about 10 per cent. is lost account the lessened moisture) it passes to 15-foot reels of bolting silk where it is sifted twice, then once through wire bolting cloth, passing directly to the shipping barrels. The grain numbers are: No. 7 used for tumbling purposes; No. 3 and No. 4 for coarse rubbing, hard materials; No. 2 for pearl workers; No. 1½, No. 1 and No. ½ for piano work (roughing) and in the making of combs, pearl buttons, etc.; No. 0¾ and 0½ for glass bevelling and for piano finishing; No. 0 for glass cutting and silver plate finishing; F. and F.F. for metal cleaning, soap and finishing carriage bodies; F.F.F. for very fine finishing; F.F.F.F., an impalpable powder, for extra fine work generally. The barrels hold about 250 to 350 pounds, according to the grain, the finer the Pumice, the heavier the barrel. All imported Pumice stone comes from Italy. There is no genuine Pumice stone found in this country. Physical characteristics: It is highly porous, light in weight, light gray in color, and the chemical composition of good Pumice stone is about as follows:

Silica	72	per cent.
Alumina	17	" "
Soda and potash	9	" "
Iron oxide	2	" "
Total	100	per cent.

The American ground Pumice is far superior to that ground in Italy. The foreign product contains considerable deleterious matter and the grading, too, is not first-class. This adulteration is a serious matter with the user, for it takes longer to finish a surface than with pure, evenly graded Pumice, and labor is much more expensive than the Pumice stone. Besides, one pays freight and cartage on four-tenths of a barrel of worthless material. Considering these phases of the matter, the manufacturing public is warned by the American grinders that the Italian-ground article is non-dependable and an expensive product. The largest Pumice mill in the world (constructed in 1906 and enlarged in 1911) is located at Bush Docks, Brooklyn, N. Y. (capacity, 15 tons ground and 5 tons lump per day), where with improved machinery the Pumice is sorted and cleaned and graded *evenly*—a very important feature where the ground Pumice will be used for fine finishing. The bolting cloth is very frequently examined in order to insure against holes which will allow larger grains to pass through and thus uneven the product. More than two-thirds of the entire importation of Italian Pumice stone comes to the Brooklyn plant. It is imported into this country in lots of from 200 to 300 tons.

The new tariff bill provided for a reduction in the duty, but this lessening of the duty, however, was offset by a rise in the freight rate from Lapari Island to New York City. Pumice stone is an interesting product from a scientific viewpoint. When we see a piece of Pumice, how few of us realize the awe-inspiring conditions under which it was made! For we have a rock specimen which was incidental to a violent act of Nature terrible to witness. Volcanic activity is characteristic of southern Italy, and there, it is again emphasized, is found this peculiar rock in abundance and of a quality which admits of its commercial use. As time goes on, new uses for it will be found and its consumption will be materially increased.

*Of the firm of Walter C. Gold, Philadelphia, Pa.

PRODUCTION OF TIN.

The production of tin in the United States is insignificant compared with that of the great tin-mining regions, such as the Federated Malay States, Bolivia and Australia, but a small output amounting to an equivalent of about fifty short tons of metallic tin was made from five localities during 1913, according to information received by Frank L. Hess, of the United States geological survey.

Three of the producing localities were in Alaska, and one each in South Dakota and South Carolina. In Alaska the York Dredging Co., working on Buck Creek, about fifteen miles east of Cape Prince of Wales, produced sixty-five tons of stream tin carrying approximately 68 per cent. of tin. The dredge ran only about six weeks, a dry season preventing longer operation. Thirty-five tons of stream tin produced in 1912 and left on the beach at York was also shipped during 1913.

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ADDRESS ALL CORRESPONDENCE TO
THE METAL INDUSTRY, 99 JOHN STREET, NEW YORK
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THE TRADE JOURNAL'S MISSION

In talking with the general manager of a great industrial concern the other day we asked him for his opinion of the journals that were devoted to his particular line of business. By that we meant what he thought about the value of these journals to him and the men whose movements he directed. "What I think about them," he said, "can be summed up in a few words. We consider them as part of our payroll, that is, we believe them to be just as much a part of our business as the men whose services we pay for, or the machinery and supplies we buy." This man was right; taken in their proper light the trade journals are part of every business, and if considered as such great benefits can be derived from their use.

The mission of the trade journal is twofold, that is, it has an advertising and an educational value. The advertising value is closely co-ordinated with the subscription list as a matter of fact. The educational value is what is directly responsible for the subscription list, and on this depends the life itself of the journal. What a man gets out of his trade journal depends on himself and his power to assimilate what is put before him in the reading pages of the journal. The modern trade journal devoted to any particular line strives to make itself an authority on its subject, and to this end every endeavor is made to get and publish only the best material in the shape of articles and news. If the reader of a trade journal realized how hard the editors work to obtain the most practical and up-to-date matter possible, he would perhaps be able to better understand the mission of his paper.

The aim, then, of the trade journal is not to disclose or give away trade secrets, as some people seem to think, but to tell the truth, publish clean cut, practical, authentic articles, the most accurate trade news, and to answer questions, free of charge, that may come up in the course of daily work. In other words, to be a current encyclopedia to which any one can turn, and be sure of getting the help needed. The editors of a trade journal are just as much interested in the news of the particular field to which the journal caters, as are the workers in that field themselves; and only a hint is required to set the machinery at work to gather together all the information possible, and to present it in tangible form. The news of new developments in processes and apparatus is eagerly sought for and worked up in readable shape to put before the readers. This is the creed of THE METAL INDUSTRY.

NEW BOOKS

INDUSTRIAL ORGANIC CHEMISTRY. By Samuel B. Sadtler. Fourth edition. 1912. Size 7 x 10 inches. 601 pages, including index. Illustrated with 120 figures. Bound in cloth. Published by J. B. Lippincott Company, Philadelphia, Pa. Price $5.00. For sale by THE METAL INDUSTRY.

This work is the fourth edition of the original book written by Dr. Sadtler, published in 1891, and eleven years have elapsed since the publication of the third edition in 1900. The organic chemical industry having grown and developed so greatly in the meantime, although the same division of the subject matter has been retained, many new technical products have been described and classified and much new matter has been added to every chapter. In some cases practically new industries have developed or are developing as new possibilities have been found for organic materials, as is seen in the artificial silk industry, the by-product coke-oven, the displacement of natural indigo by the synthetic indigo, and similar examples. The author has endeavored to present full and accurate statements of these new lines of manufacture. The present volume is as nearly up-to-date and as complete as can be expected within the limitation of space assigned for such a book, and we have no doubt but that the author's design in preparing the volume will be entirely and fully complied with, and that both chemical students preparing for entrance in practical work and manufacturers who are engaged in the development of industrial research will find assistance and benefit from this fourth edition.

ACID AND CYANIDE

To the Editor of The Metal Industry.

I notice in the February issue of the Metal Industry an article by A. A. Le Fort, in which he describes a gun metal finish on brass copper and silver. The formula contains hydrochloric acid, 1 gallon; arsenic, 3 ounces; potassium cyanide, 1 pound, and water to make 5 gallons. If the formula is correct, as published, it certainly is a very dangerous mixture. And the beginner or plater who has no knowledge of chemistry should avoid making such a mixture. The plater who has a knowledge of chemistry will not mix such a combination.

The formula contains a large amount of hydrochloric acid for the small amount of arsenic; then the additions of potassium cyanide to this acid solution is an unnecessary expense and a most dangerous one. Why the cyanide salt is added is a mystery to me. If it is with the intention of neutralizing the large amount of acid, then why use so much acid? If, on the other hand, a cyanide solution is required, why use the acid?

As the formula reads it simply means a waste of cyanide and the dangers of poisoning or perhaps death from the cyanogen gas, which is intensely poisonous. I certainly would not like to be near a plating room where a tank of this mixture is being prepared.

The formula reminds me of the plater who had an excess of potassium cyanide in his brass solution and to remove the excess he added sulphuric acid. It is certainly dangerous work.

Brooklyn, N. Y., February 23, 1914. William Voss.

To the Editor of The Metal Industry.

Replying to William Voss' queries regarding the formula for gun metal, will say that the formula as published is correct and gives fine results. Any formulas that I would have published I have tried personally, and any one who uses any of the formulas will find them entirely satisfactory. This formula was given to me several years ago, and as I found it all right I did not inquire the reasons for the use of both the acid and cyanide, so really cannot explain this matter. All I can say is that I always got better results with this solution than I have by either the acid, arsenic solutions or cyanide caustic soda and arsenic, the solution giving more of a brownish black, which is required, rather than the grayish black produced with the other solutions. In regards to the gases of this solution, I think that any one who has had any experience at all with mixing arsenic solutions would exercise proper care while mixing this solution, or any other arsenic formulas. As for poisoning the operator, the solution is not any more dangerous than the gases produced in the processes employed in precipitating old silver solutions, rinses or strips from the cyanide by acid, also precipitating silver from acid strip mixtures with salt or cutting down gold with aqua regia and precipitating with aqua ammonia or brightening a sulphuric nitric dip with salt or muriatic, or any other cases where acids and cyanides are used. Due care is always taken in any of these operations, and any one who has had any plating room experience at all should know what precautions to employ in such cases to avoid poisoning. A. A. Le Fort.

Solvay, N. Y., February 26, 1914.

We would like to hear opinions of some other platers upon this subject.—Ed.

BORO-CARBONE VS. CARBORUNDUM

To the Editor of The Metal Industry:

In his reply to my criticism Mr. Gold claims that I am pting my individual experience against his general experience. It was a natural inference, but he is mistaken. In my assertion that carborundum was superior to emery as a polisher, I was making the statement based not only upon the fact that I had proven it to my satisfaction by personally conducted tests, but also that I knew many others who had arrived at the same conclusion.

The assertion that 95 per cent. of all polishers use emery proves nothing as to comparative values. There was a time when it might have been truly said that 95 per cent. of all platers used galvanic batteries; it would not, however, have proven that dynamos were not better. I realize that many polishers do not care to take the trouble of giving any new material a trial; especially is this true in shops where piece work is done.

I do not claim that carborundum is best for every metal or other material; for instance, it is not sufficiently tough for steel polishing—aloxite is better adapted for steel—but I do claim it to be decidedly superior on cast-iron, brass, bronze, etc., the grinding and polishing of which represent important branches of the industry. As to the breaking down qualities of carborundum, it breaks with a sharp fracture, giving a sharp, fine cut, which quickly reduces the coarser lines made by the fresh wheel; while emery breaks with a dull fracture, requiring more pressure and more time to grind out the coarse lines, the operation being attended with undue heat and sometimes burning of the wheel. It is a significant fact that carborundum breaks down so well that several stove firms to my knowledge use but one grade for roughing, second roughing and finishing.

Following the appearance of my article in The Metal Industry, July, 1912, comparing carborundum with emery in the polishing room, I received a letter from one of the foremost polishing engineers in this country, in which he writes: "This is a proposition which has been put up to the writer a great many times and I agree with your handling of the proposition in every particular." I may not, and probably do not, understand the situation thoroughly; however, I believe that more than a score of years of practical application, combined with study and observation, have given me a fair insight of the subject, and my individual experience with this most superior article, carborundum, is backed by a great many polishers, including every stove shop in the New England territory barring one.

Franklin W. Hobbs.

Bangor, Me., February 28, 1914.

Shop Problems

IN THIS DEPARTMENT WE ANSWER QUESTIONS RELATING TO SHOP PRACTICE OF THE METAL INDUSTRY. ADDRESS THE METAL INDUSTRY.

ALLOYING

Q.—I have had occasion to figure on the making of a rudder and rudder stock. The rudder stock is specified to be made of either gun metal or Tobin bronze rolled rod. It is to measure 14 feet 6 inches long, and 3 inches in diameter. The rudder blade will measure 5 x 3 feet. The question has arisen as to whether a rudder stock, cast of government standard gun metal 88 per cent. copper, 10 per cent. tin, and 2 per cent. zinc, would be as strong as a rudder stock of Tobin bronze rolled rod, both for torsional and tensile strength. You will also see that the question of tensile strength in this case is of importance, as the stock is 14 feet 6 inches long.

A.—Tobin bronze rolled rod will have a tensile strength of over 70,000 pounds with a good elongation, while a casting of government standard gun metal would be only half as strong and have a poor elongation. This casting would also be extremely difficult to cast if a strength of 35,000 is required.—J. L. J. Problem No. 1936.

Q. How do aluminum and manganese affect the strength of manganese bronze when introduced in greater amounts than 0.5 per cent.?

A.—If thoroughly alloyed manganese may be introduced into manganese bronze to the extent of 3 per cent. or more and the result is increased tensile strength and reduced ductility. Increasing the aluminum does not increase the tensile strength but reduces the ductility by the readiness with which it oxidizes and produces dirty metal. Large amounts of manganese have this latter disadvantage also.—J. L. J. Problem No. 1937.

BRONZING

Q.—Will you kindly give us a receipe for steel bronzing on brass?

A.—For steel bronzing brass we give you two methods, one for simple immersion and the other as an electric deposit

IMMERSION DIP.

Prepare a saturated solution of white arsenic dissolved in muriatic acid by the aid of heat. Then prepare your dip by adding 2 ounces of muriatic acid to each gallon of water. Heat this to not less than 180 degrees Fahrenheit and then add a little of the muriate of arsenic previously prepared to the dip until a satisfactory color is obtained. The articles must be previously cleansed as for plating.

ELECTRO-BRONZING SOLUTION.

Dissolve in each gallon of warm water 5 ounces of caustic soda and 10 ounces of white arsenic in powder form. Arrange as a regular plating solution, using soft sheet steel for the anodes. Cleanse the articles as usual. Polished articles will receive a bright deposit and unfinished surfaces will have the appearance of steel. Use 2½ to 3½ volts and an immersion of 3 to 4 minutes will give a satisfactory deposit.—C. H. P. Problem No. 1938.

BURNING

Q.—We are endeavoring to burn gun metal on to flat steel bars, but are experiencing a great deal of trouble through small blow-holes appearing during the finishing cut. I may point out that we are tinning the steel previous to pouring gun metal on. Would you kindly advise us how to overcome this difficulty?

A.—If the flat steel bars in question are sandblasted until quite bright and clean, tinning may be dispensed with. The bars should be placed in the mold just before pouring and sufficient metal flowed over them to unite the gun metal and steel and wash out any cold or sluggish metal that may be causing the blow-holes.—J. L. J. Problem No. 1939.

CASTING

Q.—We have been making our brass goods used on plumbing fixtures out of yellow brass. Our customers are beginning to object to same and want red brass as they claim they wear better and are more substantial as the increase in cost from yellow to red metal will cut quite an item in cost of production. As the majority of the castings are nickel-plated we cannot see where it makes any difference whether they are made of red or yellow brass.

A.—If you make them out of red brass your cost of production will be about even, for with using the more expensive red metal with a good composition you will find a very large percentage of good castings can be obtained while with yellow brass there will be found a considerable quantity of bad castings both before machining and afterwards on account of the dross and foreign substances.

The grain in red metal is much closer, will stand a higher pressure and wear better. Almost all the best lines of plumbing brass goods on the market are at present made from red brass, they have become a trade-marked line and are sold on the basis of quality rather than price. They are driving the cheap yellow brass goods off the market as the plumbers and the public have are subject to, and the trouble and expense that they have caused found out that the red metal castings are the most economical in the end, owing to the hard wear that some plumbing fixtures in the past.

The manufacturers of red brass plumbing goods guarantee their product and co-operate with the plumbers. It is needless to say that the manufacturers of yellow brass competitive goods have no co-operation to give as they have not got the quality or the goods to back them up.—P. W. B. Problem No. 1940.

CLEANING

Q.—Will you kindly answer the following question? I am making some aluminum castings (10 per cent. zinc) and they are discolored by the sand. Can you tell me of some simple cold dip that will remove the color and make them white?

A.—You can readily remove the discoloration from your aluminum castings if you immerse them in aqua fortis (38 per cent. undiluted). The acid dissolves the oxide, but does not affect the metal. A momentary immersion is all that is required; then drain well and wash in cold and hot water or use the other methods of drying-out available, but the castings must be thoroughly washed in cold water after the acid dip.

You might also try a cyanide dip for the purpose. To produce this dip dissolve 6 to 8 ounces of cyanide of potassium in each gallon of water, use warm and wash and dry the castings afterwards as previously mentioned.—C. H. P. Problem No. 1941.

COPPERING

Q.—I have a large amount of malleable iron faucets which are used on steel barrels that are to be copper plated. So far I have plated same in the regular electro-plating bath, but find it to be pretty expensive, as I have to lacquer same to keep them from becoming tarnished. I have tried the sulphate of copper and sulphuric acid dip, but it would not work on rough castings, and there is no way of tumbling them, as they are assembled before plating. What I would like to know is, can you give me a formula for a cheap copper dip that will hold its color.

A.—We are unable to assist you in producing a copper dip or any form of copper deposit that will not tarnish. As you are no doubt aware copper or copper deposits tarnish more readily than any other metal or metal deposits, and therefore require to be protected in some manner.

If the faucets are tumbled in sal soda water so that a clean surface is obtained a copper dip made up from two ounces of sulphate of copper and 6 to 8 ounces of sulphuric acid in each gallon of water can be used to produce a copper tone. After copper plating the faucets should be washed thoroughly and then immersed in boiling water to which is added about 2 to 4 ounces of black whale oil soap per gallon of water. Immersing in this solution would not only enable the faucets to dry more rapidly, but also leave an invisible film of grease upon the faucets which would protect them from tarnishing for a considerable length of time. This process may avoid lacquering whichever method of coppering is used.—C. H. P. Problem No. 1942.

FINISHING

Q.—Can you tell us how to obtain the finish on the enclosed pin?

A.—The finish upon the brass buckle submitted to us is termed the "burnt ivory" finish. To produce this finish the buckles should be first cleansed in the ordinary bright acid dips, then coated with a thin film of silver in a warm silver dip consisting of the following:

Water	1 gal.
Chloride of Silver	¼ oz.
Cyanide of Potassium	½ oz.

After silvering, the buckles should be washed and dried. The ivory finish is now applied with a spray, the material consisting of a celluloid enamel. After the surface becomes thoroughly dry and hard the imitation burnt finish is applied. This consists of dry-burnt amber or sienna and a little yellow ochre. This is mixed with turpentine and turpentine copal varnish, using very little of the varnish, so that the coloring matter does not become tacky, but dries quickly with a dead finish. Apply the color with a small pencil brush. Then dry on the lacquer heater or in the ordinary atmosphere. Now remove the color from the high lights with a rag, slightly moistened with a mixture of equal parts of turpentine and boiled linseed oil. This will give you the finish as per the sample. Light chrome greens or yellows may be used for the green ivory tones.

The silver is used to produce a white base for the enamel. If, however, this is too expensive, and you do not want to use silver at all, prepare a lacquer consisting of white French copal varnish, prepared with denatured alcohol. Then thin slightly with a mixture of equal parts of fusel oil and amyl acetate. Immerse the thoroughly cleansed and dried articles in this lacquer; then dry in the usual manner and when hard apply the enamel.—C. H. P. Problem No. 1943.

GALVANIZING

Q.—We are engaged in a small way in the galvanizing of iron wire, using the hot process with sal ammoniac as a flux. We find that we suffer a loss of zinc amounting to 30 per cent. or more through dross, zinc ashes and volatilization. Could you inform us if this loss is too high and how it can be avoided?

A.—You probably have a small pot and get your metal too hot. A pyrometer protected by an iron pipe would enable you to keep the heat constant. It ought not to go over 950 deg. Fahr., unless a very large amount of work is run through the pot. The dross from a zinc pot ought not to be over 2 to 4 per cent. of the weight of zinc in the pot per week, and it should be removed at the end of each week. A few hundredths per cent. of aluminum will throw down the dross.—J. L. J. Problem No. 1944.

GILDING

Q.—Will you kindly advise what is the French method of nitrate gilding?

A.—The method referred to as the French method of nitrate gilding is what is more commonly termed mercury gilding, or fire gilding.

The method consist of producing a gold amalgam by dissolving fine gold in metallic mercury or quicksilver, as it is sometimes termed. The gold is incorporated with the mercury by the aid of heat. When cold the excess of mercury is removed by pouring the mercury in a chamois leather bag immersed in water and forcing the excess of mercury through the leather by hand pressure. This leaves a pasty amalgam that is used in gilding.

The articles of brass, copper or bronze (soft metals cannot be used in the process) are covered with a film of mercury by immersing in a solution of nitrate of mercury for a few seconds after cleansing in the regular manner, or until the surface of the articles are coated with a film of mercury. The pasty gold amalgam is then applied to the articles by a fine steel wire hand brush as uniformly as possible. The articles are then heated upon iron pans over a clear fire or in a retort with provisions made to carry off the mercury fumes. As soon as the mercury has become evaporated and the appearance of a dull gold is noted the articles are immersed in water. The finish is developed by scratch brushing and burnishing. Only pure gold remains upon the surface. The operations can be repeated so that very heavy deposits of gold can be obtained in this manner.

This method is one of the earliest practiced in gilding and has probably been used for more than two hundred years. It probably originated in France, hence its name. Firms in the Attleboros (Mass.), Newark, N. J., and Waterbury, Conn., use this method. Probably all the military and naval officers' buttons are gilded in this manner, the United States Government specifying fire gilt in their contracts for buttons of this description, which is identically the same method as that described above.

A short article will probably appear in the columns of THE METAL INDUSTRY in the near future describing the method in detail.—C. H. P. Problem No. 1945.

MIXING

Q.—Will you kindly give us formulae for mixing phosphor bronze, best yellow brass for fixtures and red brass for bearings, molds, etc.?

A.—The best mixture for yellow brass castings for mixtures is as follows:

Copper	76
Zinc	18
Lead	3
Tin	3
For red brass casting:	
Copper	85
Lead	5
Tin	5
Zinc	5
For phosphor bronze:	
Copper	75
Lead	10
Tin	10
Royal phosphor copper	15%—5

—J. L. J. Problem No. 1946.

MOLDING

Q.—Would you kindly advise me as to the grade of sand and mesh of riddle best adapted to the manufacture of aluminum hollow-ware? The No. 1 Zanesville sand and No. 8 riddle which I now use produces a rough surfaced casting which is hard to buff.

A.—No. 0 Newport sand is a very satisfactory sand for aluminum castings. It should be put through a No. 10 riddle.—J. L. J. Problem No. 1947.

SOLDERING

Q.—We would like to learn the name of the strongest solder applied with a solder copper for sheet bronze metal.

A.—None of the tin-lead solders or soft solders have much strength. A solder composed of the following is malleable although not very ductile and may be employed in some cases.

Tin	34 parts
Lead	33 parts
Zinc	33 parts

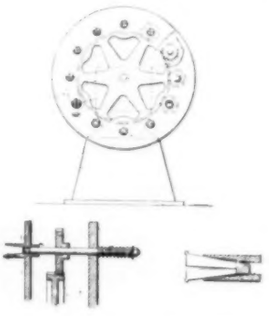
Government standard A-1 babbitt has been used by some firms as a solder where a strong joint is wanted.—J. L. J. Problem No. 1948.

PATENTS

REVIEW OF CURRENT PATENTS OF INTEREST TO THE READERS OF THE METAL INDUSTRY.

1,083,046. December 30, 1913. **Polishing Machine.** Jan Zywicki, Newark, N. J.

This invention relates to a polishing machine, shown in cut, which is constructed to grasp and release articles to be polished, the grasping and releasing devices being arranged in series and secured on a revolving structure so that when it revolves, the structure presents the articles successively to a polishing wheel or the like. The grasping and releasing devices rotate on their own axes and thereby submit every portion of the face of the article to be polished to the action of the polishing wheel.



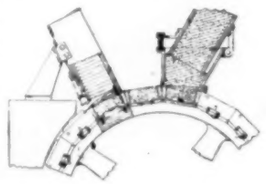
The invention further consists of means for automatically closing and opening the grasping means to permit the insertion and removal of the articles placed in the machine.

The invention also provides an adjusting mechanism which regulates the revolving structure in its relation to the polishing wheel so that as a wheel wears down, the revolving structure can be advanced toward it.

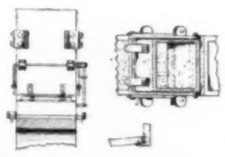
Another feature of the machine is the driving mechanism for rotating the individual grasping devices and revolving the structure and for stopping and starting either of the revolutions without interfering with the other.

1,084,048. January 13, 1914. **Molding Machine.** E. F. Theimann, Milwaukee, Wis.

This invention has for its object to provide mechanism, as shown in cut, for automatically preparing molding flasks by filling them with sand around a pattern, supplying them with movable bottoms, compressing the sand against the pattern by means of said bottoms, and stripping or drawing the patterns from the sand.



Another object of this invention is to accomplish the above in a continuously operating mechanism.



The patent covers the following claim: A molding machine, comprising a rotary drum, rods slidable thereon, patterns carried by the rods, stripping plates through which the patterns project, crank arms carried by the drum and connected with the rods, and means in the path of the crank arms for causing the crank arms to turn and thereby move the patterns through the stripping plates, flask sections attached to the drum, means for filling the flask sections with sand, and means for compressing the sand around the patterns.

1,086,582. February 10, 1914. **Manufacture of Molds for Casting Metals.** C. J. M. Bohl, Brooklyn, N. Y.

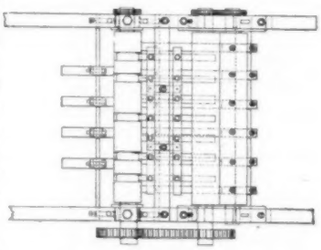
This invention relates to molds for casting metals, and the object thereof is to provide an improved mold for this purpose by means of which the delicate outlines and designs of a finely wrought pattern can be perfectly reproduced in a mold from said pattern; a further object being to provide a mold for the purpose specified which will stand or resist the heat of a furnace and also the heat of the metals poured into it without being fractured or broken.

The patent covers:

The method of making molds and other articles herein described, which consists of mixing plaster of Paris and ashes and reducing the product by mingling water therewith to a thick liquid, pouring said liquid over or around a pattern in a suitable receptacle to form the mold, allowing the mold to set or become hard, separating the mold and pattern, slowly drying the mold in a low temperature of from 100° to 200° Fahrenheit, painting the mold with melted lard and then heating said mold in an oven, gradually raising the temperature to from 800° to 1000° Fahrenheit.

1,083,495. January 6, 1914. **Apparatus for Galvanizing or Otherwise Coating Metallic Sheets with Metal.** David Jones Castell Grenig and Henry Folland, Brandig, Glanamman, Wales.

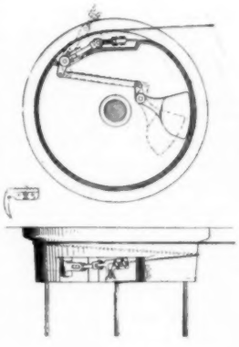
This invention relates to apparatus, as shown by the cut, for galvanizing or otherwise coating metallic sheets with metal, and is illustrated in the accompanying drawing.



The inventor's claim: In apparatus for galvanizing or similarly coating metallic sheets, in combination a frame, a pair of bottom rolls, bearing blocks for such rolls mounted in the frame, the blocks for the upper roll being adapted to slide vertically in the frame, adjustable stops to limit the upward movement of the bearing blocks for the top roll, bolts with bent ends to support the necks of the top roll, removable liners for the bent ends of the bolts, and means to adjust such bolts vertically to raise and lower vertically the top roll to support the top roll and relieve the lower roll of its weight, and to vary its position relatively to the lower roll to permit varying thicknesses of plates to be fed between such rolls.

1,085,664. February 3, 1914. **Wire-Drawing Block.** Elbert H. Carroll, of Worcester, Mass. Assignor to Morgan Construction Company, of the same place

The object of the present invention is to provide a wire drawing block with an improved gripping mechanism for holding the end of the wire at the beginning of the drawing operation, and to provide means for holding the wire gripping mechanism in a recess in the side of the wire drawing block during the rotation of the block in case the gripping mechanism is relieved from the strain on the wire, and these objects are accomplished by means of the construction and arrangement of parts as shown in cut.

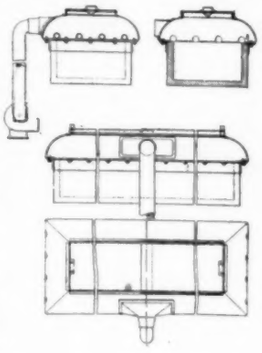


In the type of drawing blocks to which this invention relates, the gripping mechanism when suddenly relieved from strain by the breaking of the wire, for example, is liable to be thrown violently outward by centrifugal force, striking against anything in its path and jeopardizing the safety of the attendant. By the present invention there is provided a counteracting force to retain the gripping mechanism in the recess of the block by the rotation of the block itself, and at the same time allowing the gripping

mechanism to be freely withdrawn when the block is at rest to enable the end of the wire to be engaged.

1,085,742. February 3, 1914. **Hood for Electro-plating Tanks.** C. E. Leffel, Niagara Falls, N. Y. Assignor to the Spirella Company, of the same place.

The object of the invention is to provide an improved construction and arrangement of hood, as shown in cut, for electro-plating tanks, whereby the fumes, gases and vapors arising from the electrolyte in the tank and produced by the electro-plating action may be conducted away and prevented from escaping into the open air.

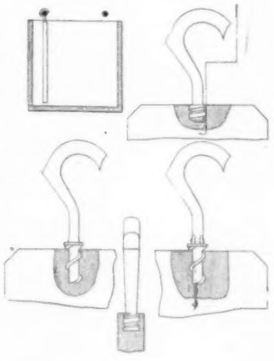


Various electrolyte solutions are used in the electro-plating industry. In many cases the electrolyte is of such composition, and the reactions taking place within the cell are such that fumes, gases or vapors are given off by the cell into the open air. Such fumes and gases are often obnoxious and disagreeable and may, as when the electrolyte is a cyanid solution, be actually poisonous. For this reason it is often dangerous for the operators to work around or near the plating tank, and usually it is necessary to provide a special building or room in which the tanks are placed, so that the vapors or fumes given off will not affect other surrouding apparatus or materials.

1,085,743. February 3, 1914. **Anode Support.** C. E. Leffel, Niagara Falls, N. Y. Assignor to the Spirella Company, of the same place.

This invention relates to anode supports for use in electro-plating.

The object of the invention is to provide a support for the anode plate which is of simple construction, and which can be cheaply manufactured and readily applied to the anode in such manner as to provide a good electrical contact, and wherein the support can be readily removed from the anode when the latter is worn out, and used upon other similar anodes.

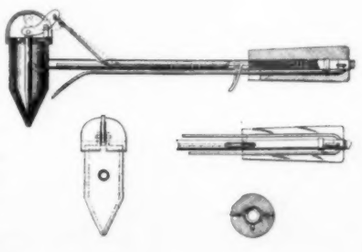


The invention comprises the construction and arrangement of parts as shown in cut.

1,088,286. February 24, 1914. **Soldering Iron.** L. M. Lasley, Portland, Ore.

This invention relates to improvements in soldering irons, and the object of my improvements are, first, to provide means by which melted solder can be automatically applied to the object being soldered direct from the iron itself; and second, to provide a means by which the soldering material can be automatically melted while the iron is in use and kept continuously melted.

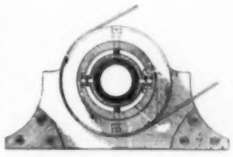
As shown in the cut the improvement is best described by the patent claim:

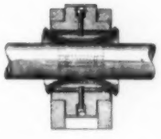


In a soldering iron, a hollow body having an opening at its lower end, a fulcrum block carried by the upper side of said body, a lever pivotally secured intermediate its ends to said block, a pin pivotally secured to one end of said lever, said pin adapted to close the opening in the lower end of said body, a hollow rod having a handle connected to said body and extending at right angles thereto, a gas tube carried by said handle and extending under said rod to a point adjacent said body for directing a flame on said body, an angularly bent wire connected to said lever and extending back through said rod, a spring bearing upon said wire for holding said pin in said opening of said body, a trigger comprising a wire loop connected to said wire for moving said wire in one direction, said gas tube passing through said trigger whereby said tube will be held in a central position under said rod.

1,086,698. February 10, 1914. **Buffing Machine.** A. J. Baulig, Rome, N. Y. Assignor to Rome Metallic Bedstead Company, Rome, N. Y.

This invention relates to a machine for producing on brass bedsteads what is known as a "velvet" finish which has heretofore been produced only by hand. In that finish there is on the surface of the brass a slight trace of lines running circumferentially around the tube and while it can be produced on a straight length of tube by putting the tube in a lathe and applying an abrading such as emery cloth to it as it rotates, yet in brass bedsteads the tube must be bent, previously to its being polished or finished, into the yoke form required for the end frame of the bedstead, and after being so bent or shaped it can not be swung in a lathe, hence this particular finish has always been produced by hand.



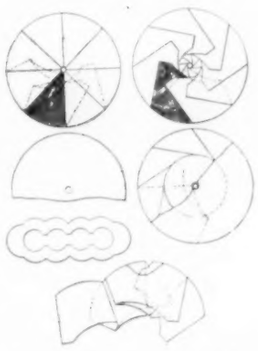


The invention resides in a rotating ring carrying within it a tubular buffing device and rotated by an external belt, as shown in cut. Thus as the ring and buffing device rotate, the tube to be finished can be introduced axially into the buffing tube and, without being itself rotated, can be passed slowly through the said tube which produces on its surface the velvet finish above described. Moreover, the emery cloth within the buffing tube is so mounted on a yielding support or backing of felt that the bent or elbow portion of the tube can also pass through it, even if the bend includes a curve of 90 degrees, and the bent or curved part will receive the same finish as the straight portion.

1,087,781. February 17, 1914. **Buffing or Polishing Wheel.** G. P. Keller, of Hoboken, N. J.

The invention relates to buffing or polishing wheels formed of a plurality of folded pieces of muslin or other fabric material.

The object of the invention is to provide a new and improved buffing or polishing wheel arranged to prevent the peripheral face of the wheel from unraveling and thus insuring long life of the wheel, and to allow using the wheel until the fabric pieces are practically used up.



In order to accomplish the desired result use is made of a plurality of folded fabric pieces, each piece being bias cut and in the form of an elongated endless band having a scalloped edge, the band being doubled up lengthwise to form a primary fold, which is doubled up transversely to form overlying second folds, which are doubled up to form partly overlying third folds, the doubled-up side of one folded fabric piece extending between the second folds of the next following fabric piece, the scalloped edges of each piece overlying one the other and the scalloped edges of the several pieces forming the peripheral face of the wheel.

A practical embodiment of the invention is represented in the accompanying drawings.

EQUIPMENT

NEW AND USEFUL DEVICES, MACHINERY AND SUPPLIES OF INTEREST TO THE READERS OF THE METAL INDUSTRY.

A NEW CONTINUOUS CHART RECORDING INSTRUMENT

The Brown Instrument Company and the Keystone Electrical Instrument Company, of Philadelphia, Pa., are placing on the market a new type of continuous recording instrument for use as an electrical pyrometer for recording temperature, and also as a recording voltmeter or ammeter. Great efforts have been made to produce an instrument as simple in construction as possible and of the most compact form. The case of the instrument is only 15 inches high by 8 inches wide, and projects from

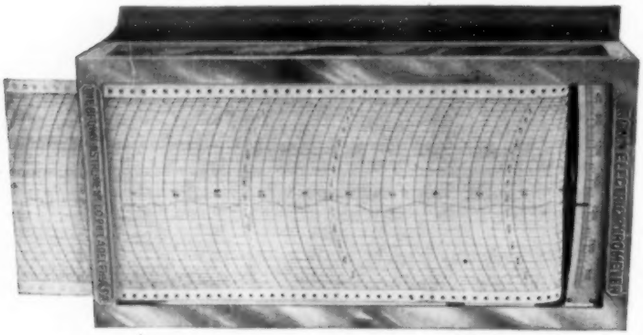


FIG. 1. THE COMPLETE CONTINUOUS CHART RECORDING INSTRUMENT.

the switchboard or wall 7 inches. The space occupied by the instrument has been largely reduced by placing the clock mechanism behind the record chart instead of to one side, and the record chart is the only part shown on the face of the instrument. A

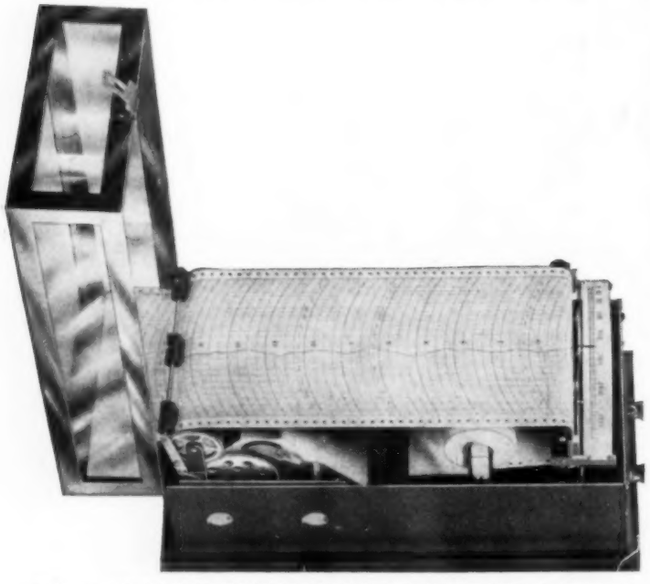


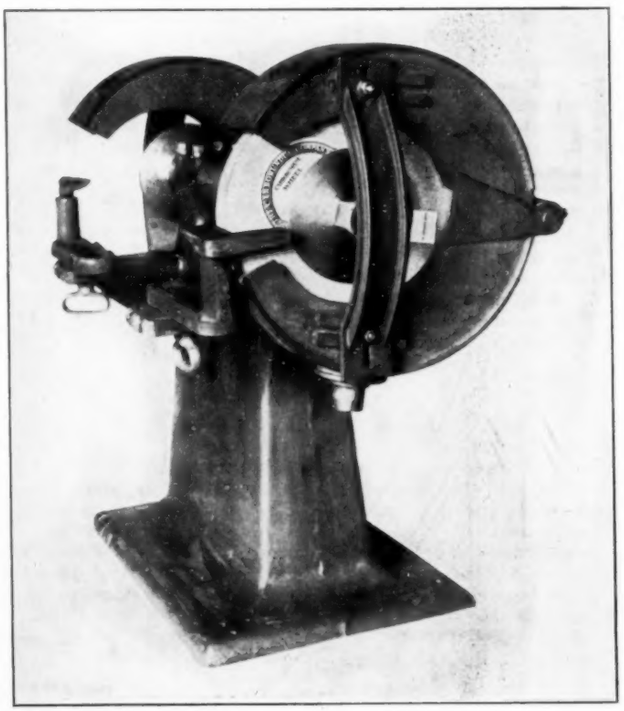
FIG. 2. INTERIOR CONSTRUCTION OF INSTRUMENT SHOWN IN FIG. 1.

two months' roll of record paper is used which can be supplied with an ink ribbon to make a dotted ink record, or the record can be made on coated paper which does away with the use of ink or ribbon entirely. It is only necessary to wind the clock once a week and change the roll of record paper once every two months. We show in Fig. 1 the complete instrument with 10 hours record on the recording chart. One scale is placed above the record so that the indications are clearly visible at all times, and the paper has the scale printed on it for direct reading.

In Fig. 2 we show the instrument with the door open and the interior construction can be clearly seen, this case need only be open once every two months to renew the roll of paper. This new continuous recording instrument will prove particularly advantageous for use as an electric pyrometer in conjunction with thermo-couples, for resistance thermometers for measuring low temperatures, or for recording volts or amperes. As the d'Arsonval type of direct current instrument is used of the frictionless type to prevent lag in the readings a particularly sensitive and accurate instrument is secured. Information regarding this new instrument can be secured from the manufacturers.

ADJUSTABLE GRINDER HOOD

The hood shown in the cut is being produced by the Valley City Machine Works, Grand Rapids, Mich. The hood is adaptable to any make of emery grinding wheel and affords protection to the smallest diameter wheels that are practicable to use; it also protects the nut on the arbor. The photograph



THE ADJUSTABLE GRINDER HOOD IN PLACE.

shows the 24-inch hood adjusted down to fit over an 18-inch diameter wheel. It will be noted that the wheel is fully protected and that the hood has been adjusted backward so that the face of the wheel is get-at-able. The guard is made in all sizes from 8 to 24 inch diameters.

BASLAC LACQUERS

The Bastian Brothers Company, of Rochester, N. Y., being users of large quantities of lacquers and having tried a great many makes in all grades and at all prices without obtaining satisfactory results, announce that they decided, as they had the facilities for so doing, that they would produce their own lacquer. Having been successful in making up what they needed for their own purpose, they have now decided to put the lacquer on the market and are now taking re-orders in barrel quantities. This lacquer is sold under the name of Baslac and is especially recommended for all oxidized finished, rose gold, matt gilt and satin finish silver work, and can be applied by means of either a brush, dipping or spraying.

ELECTRO PLATING ZINC ALLOY DIE CASTINGS

COMPILED BY NATIONAL LEAD COMPANY, NEW YORK.

CLEANSING AND POLISHING.

Die castings that are to have a polished surface should be cut down with the usual buff wheels and tripoli composition. The finishing should be accomplished with white compositions of Vienna lime. After the articles have been polished the excess of polishing material should be removed by the aid of benzine or gasoline and afterwards dried out in maple sawdust. If the benzine or gasoline is dispensed with then hot alkaline solutions should be used for cleansing. The strong alkalies of caustic soda or potassium should never be used in cleansing zinc, as they have a reducing action upon the metal and produce oxides; thus destroying the polished surface.

The cleaner should be maintained at a temperature of 160 to 180 deg. Fahr. Soda ash may also be used for the purpose. In such an event one pound of the material and quarter of an ounce of cyanide of potassium should be used per gallon.

The article should remain in the cleansing bath for a few minutes and then the excess of the polishing material brushed away, using an oval painter's sash brush for the purpose. The rubber set variety is the most economical. After cleansing immerse in clean, cold water and then into a cyanide dip. This dip should consist of 6 ounces of cyanide of potassium or sodium to each gallon of water and should be used cold. After re-washing the articles in clean, cold water they are ready for the plating bath.

Articles to be unfinished are cleansed in the same manner if somewhat corroded, due to the formation of oxide of zinc upon the surface caused by the contact with moisture. Immerse for a few seconds in a pickle consisting of one part of hydrochloric acid and four parts of water. This will dissolve the oxide. Then rinse the die castings in cold water, immerse in the cleaning solution for a few seconds, re-wash in cold water and then scratch brush to bring up the color of the metal. Repeat the cleaning operations, using only the cleaning solution and the cyanide dip, and the casting is ready for plating. If the articles are to be a polished finish, then the scratch brushing may be dispensed with.

COPPER PLATING DIE CASTINGS.

The solution for copper plating should consist of the following proportions: Water, 1 gallon; cyanide of copper, 3 ounces; carbonate of potash, 1 ounce; cyanide of potassium or sodium, 4 ounces.

To prepare the solution the potash and copper should be dissolved in half the amount of hot water, the cyanide in the balance of lukewarm water; then mix thoroughly together. Use the solution at a temperature of 150 deg. Fahr. and at 2 to 2½ volts pressure. Cast copper anodes give the best results, but the electrolytic variety may be used.

BRASS PLATING DIE CASTINGS.

Prepare a solution exactly the same as the copper bath. Then dissolve equal parts of cyanide of zinc and cyanide of potassium in warm water. An addition of 1 ounce of the zinc carbonate and the same proportion of cyanide should be added to the copper bath per gallon; then add ½ ounce of sal ammoniac per gallon of solution. If the color should be too deep a yellow a little more zinc should be added to the bath to obtain the requisite shade. This bath should be run at a temperature of 120 deg. Fahr. and at a 2 to 3 volts pressure. The cleansing of the articles should be as previously stated.

NICKEL PLATING DIE CASTINGS.

Much trouble has been experienced in nickel plating die castings with the ordinary solution, due to black streaks appearing in the deposit caused by local action of the ordinary solution upon the metal. The following formulas will give satisfactory results without the difficulties mentioned: Nickel sulphate, 10½ ounces; potassium citrate, 7 ounces; ammonium chloride 10½ ounces; water, 2½ gallons.

To prepare this bath dissolve the nickel sulphate and ammonium chloride in half the amount of hot water prescribed; then dissolve the potassium chlorate in the balance of the water and mix thoroughly. The voltage should be 2½ to 3 volts. This bath should always be kept neutral to avoid black streaks. For this purpose pure caustic potash should be used dissolved in water and added to the bath so that the solution is neutral to the test of red or blue litmus paper. The following bath is used extensively in plating articles made from zinc and gives excellent results: Double nickel salts, 8 ounces; chloride of sodium, 1 ounce; magnesium sulphate, 2 to 4 ounces; water, 1 gallon.

To prepare the bath dissolve the nickel salts in half of the water at a temperature of 180 degrees and dissolve the other salts in the balance of cold water; then mix thoroughly together. Use this solution cold and anodes of cast nickel should be used. The voltage should be 2½ to 3½ volts. The articles to be nickel plated may be plated direct or previously lightly coated in the copper or brass baths. The time of immersion in either of the nickel baths should be according to the thickness of deposit required, although thirty minutes gives a fairly good deposit in either case.

SILVER PLATING DIE CASTINGS.

Cyanide of silver, 3 ounces; cyanide of potassium, 4 ounces; water, 1 gallon.

Use anodes of pure silver at about 1 volt pressure. Die castings for silver plating should be previously copper plated for a short time then amalgamated in a mercury dip consisting of the following proportions: Water, 1 gallon; oxide of mercury, ½ ounce; cyanide of potassium, 6 ounces.

After copper plating and washing in water the articles are immersed in the dip for a second or two or until uniformly coated with mercury. They should then be re-washed and immersed in the silver bath. Or the articles may be nickel plated in one or the other of the nickel baths and quickly coated in the silver striking solution and then directly immersed into the silver bath without rinsing in water.

The silver strike should consist of the following: Cyanide of silver, ½ ounce; cyanide of potassium, 6 ounces; water, 1 gallon.

Use silver anodes with 3 to 4 volts pressure. The nickel surface must be immediately coated over for successful silver deposits.

GILDING DIE CASTINGS.

In gilding die castings the articles must be previously coated with brass or copper and a bright lustre maintained upon the articles.

The following formula will give excellent results: Phosphate of soda, 8 ounces; sulphate of soda, 1½ ounces; cyanide of sodium, 6 pennyweights; chloride of gold, 6 pennyweights; water, 1 gallon.

To prepare the solution dissolve the cyanide and chloride of gold in part of the hot water and the sodium salts in the balance; then mix together thoroughly. Anodes of gold, platinum or carbon may be used and the bath should be kept at a temperature of 180 deg. Fahr. at 2 volts pressure. If the articles are previously coated in the copper bath they should afterwards be flashed in the brass bath to save an excess of gold.

The usual lacquers should be applied to brass, copper, silver or gold finishes. The various antique finishes may be applied to the articles after plating in the requisite solutions for the various finishes in vogue by using the various agents which most platers are familiar with.

In plating die castings or articles of zinc it is a distinct advantage to use as little free cyanide as possible. If this is reduced to a minimum very little difficulty will be experienced in the blistering of the deposit.

In nickel plating the baths should be maintained at the neutral point, as previously noted.

DERIHON PORTABLE HARDNESS TESTING MACHINE

This machine is for testing the hardness of metals according to the Brinell method (making an impression with a 10 mm. ball under a pressure of 3,000 kgs.).

FIG. 1. THE DERIHON PORTABLE HARDNESS TESTING MACHINE.

Fig. 1 shows the machine ready for the test with the lever raised and resting on the shaft. The piece to be tested is placed on the table of the machine, which is then raised until the piece is in contact with the ball. This done, the lever is pulled slowly over so as to give a progressive pressure (the pressure is registered by a small manometer) until 3,000 kgs. are applied. When this figure is reached the lever is slowly returned to its former position and the test is completed. Under normal conditions it is usually sufficient to move the lever through an angle of 45 degrees to obtain the required pressure of 3,000 kgs.

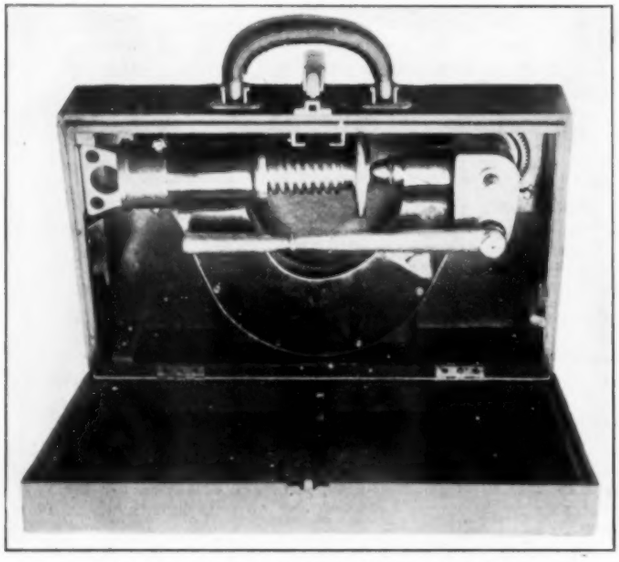


FIG. 2. THE MACHINE PACKED IN ITS CASE.

With each machine a small piece of steel is furnished in which a standard impression has been made, the size of the diameter being stamped on same. The standard piece is of BND steel, an air-hardening chrome-nickel steel.

The deflection of the frame being relatively weak (1 to 1.5 mm,) a register, the construction of which resembles a metal manometer, is installed in the hollowed out part of the frame. By means of a needle and a graduated dial, the deflection and, therefore, the pressure exerted on making the test can be quickly and easily read. To adjust the machine all that is necessary is to open the case enclosing the mechanism above the frame. Should the machine ever get out of adjustment, a comparison should be made on the standard piece, and when an impression of the same diameter has been made, the needle is brought over the figure 3,000 by means of a small adjusting screw. This adjustment, however, would only be necessary through some accidental cause independent of the operation of the machine under normal usage. Fig. 2 shows the machine packed in its portable case.

This machine is placed on the market by H. A. Elliott, 507 Majestic Bldg., Detroit, Mich.

NEW ELECTRIC DRILL

The electric drill illustrated has a new type motor that will operate upon direct current of 110 volts, or alternating current 110 volts, 25, 30, 40 or 60 cycle, single phase current. This motor will operate with the same efficiency upon either current. The motor is a universal motor, having been designed exclusively for use in portable electric drills. The motor is manufactured by the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., The gears used in this electric drill are made out of chrome nickel steel, hardened and run in grease. All bearings run in grease.

UNITED STATES ELECTRICAL DRILL COMPANY'S NEW DRILL.

The motor is of the air-cooled type and is operated by attaching to the ordinary incandescent lamp socket. These electric drills are portable and light in weight, as the casing of the motor is made out of aluminum. This drill is manufactured in three sizes, 3/8, 1/2 and 7/8 inch, drilling these size holes in metal. This drill is manufactured by the United States Electrical Tool Company, of Cincinnati, Ohio.

"BABBITT" SUBSTITUTED BY VULCAN FIBRE

Transmission bearings have up to the present time been largely made of Babbitt and other compositions, of which Babbitt has been found to be the best. Although many efforts have been made to find a substitute to take the place of this high priced material little progress has been made.

An inventor in Germany has at last produced a bearing made from "Sheet Vulcan Fibre" which can be produced at an extremely low price. It is said to outlast Babbitt many times and is claimed to be superior to the best Babbitt bearing. Economy

in lubrication is another extremely important factor, and on this point the fibre bearing is said to be also far superior to the Babbitt bearing.

The invention is reported to have been thoroughly tried out abroad and has been in practical use for some time in several factories. It is now on the market either for the sale of the patent or for the purpose of forming a company in the United States for its manufacture and sale.

All particulars in regards to the same can be obtained from R. F. Lang, 8-10 Bridge street, New York, N. Y.

BEARING METAL ECONOMY

By A. P. Wright.*

Does the present high cost of tin justify the manufacturers of machinery to continue its use, if not where must he look for a substitute, that will meet all the requirements of an all tin base babbitt? After a good many years of experiment I believe I am justified in saying that I have solved the problem, and that a copper-lead alloy, properly made, will prove a worthy substitute for all high grade babbitt metals. While I have never been East, and do not know whether any progress has been made along this line, I believe there are a few firms that make a copper-lead alloy, but evidently do not have much success, with it as they do not control the lead with any degree of satisfaction, as it shows lead sweat under heat, exposing a tendency to disintegrate, which will never do.

I do not know whether my process to control the lead is any different from that which is already known, but I do know that I have made a 50-50 alloy and 60-40 alloy, cast it in mold, recast it again, without its showing any lead sweat, further putting the ingot in the fire and heating to a red heat, without showing a trace of separation. The only objection to this metal would be the melting, as the bearings would have to be filled direct from the crucible. In this day of cast steel perfection, this objection would be reduced considerably, as there would not be any risk of cracked castings, resulting from the hot metal, as this metal would have to be poured at about 1,550 deg. F. Where practical metal bushings could be made, and where large bearings are needed their size could be greatly reduced by having this metal made in sections and fitted in grooves. I am pretty sure that by this method, it would cut the weight of metal used to one-half and the cost also. Would this not be worthy of a trial, as you know that some machines use from 500 to 3,000 pounds of metal in their bearing, costing 50 cents per pound or more? While I am at this point, would like to say a word about the price of tin, which is regulated by a syndicate, and not by supply and demand, as it should be. This keeps the metal user in a state of unrest at all times, for no other metal fluctuates as tin does.

When I first engaged in the metal business, in the nineties, tin was selling in the neighborhood of 13 cents a pound, continuing up and down until it reached near 55 cents per pound, declining until the present writing to about 38 cents, and before this letter goes to print will be on its way to the 50 cent rate again. Who knows at that rate if you will not before long be paying $1 a pound for babbitt to meet your requirements. Is not a trial of these ideas worthy of your thoughts? Someone has to be the pioneer of progress, some one has to be criticized and laughed at. I believe I am on the right road, and as the old proverb says, "a pound of pluck is worth a ton of luck," I am going to start the machine builders thinking.

The secret of all bearing is plenty of good oil, in many cases you could do without a high price metal alloy, perhaps using maple blocks or even brass, with leather inserts. This will no doubt cause a sneer from those who always say it can not be done. This leads me back a good many years when I finished my school days. I thought I would like to be a locomotive engineer, so accepted a position with the Southern Pacific. I started in by helping a man whose work was to look over the engines, as they came in. Most of the journals were brass, in those days, lined with some of their own make of metal. Very few of the journals would wear very much, or run hot. There was always allowance for taking out a shim, and driving the wedge in a little, to take up any lost motion.

I remember one large freight engine which made a one hundred mile run every three or four days. The engineer on its return, always reported a hot pin, and by the looks of the wheel and connecting rod, there must have been some friction, as it indicated a liberal supply of grease dope. At every stop the metal would run out like so much mercury, leaving nothing but the brasses. New brasses and several overhaulings failed to check the trouble, as on each return trip the same report —hot pins.

The machinist finally suggested leather, and while it did not look good to the master machinist, he was willing to try the experiment. The brasses were scraped down, and four slots were made about ½ inch wide, heavy sole leather was cut and fitted in, so that they extended just a hair above the surface of the brasses, and to the surprise of every one that engine never had another hot pin. They were still using leather on that engine up to the time I went to fire a locomotive, and I lost track of any shop problems that may have come up later.

Now to get down to the real reason for this letter, and for the sake of argument; I want to say that copper-lead alloys properly made will revolutionize the entire babbitt metal industry. While I have held the secret of a successful application of lead and copper, for a good many years, I have never tried to have my formulas patented, for in so doing I would have to tell my secrets, and being a man of small means I would stand no chance with a fight with some of the wealthier metal merchants. If my metals prove what I believe them to be there will be no end of imitators. I would sooner take a chance with having my secrets discovered, for it would be some satisfaction to see just how near my competitors would come to it, as I believe no two assayers would get the same results on analysis. Surely they could not find my method, which is the real secret.

Now in closing I will state that I can control the lead contents in any quantity up to 60 per cent., for beyond that the metal would be of little value, being too soft. I use three distinct methods without the use of any other metal but copper and lead.

For the inspection of those interested, you will find on exhibition at the office of The Metal Industry, cross sections cut from ingots of two of my metals containing a maximum amount of lead, namely a 50 lead, 50 copper No. 1 alloy and a 60 copper and 40 steel No. 2 alloy and other tests on application. In each of these alloys the lead is controlled by a different process, showing that the secret is by no means rare.

While I am not ready to give to the world my secret, I think I ought to get some benefit from my invention, knowing that sooner or later the knowledge will become public property, then you can look for a complete change in the babbitt metal industry.

This metal has perfect anti-friction qualities, will stand up under any service, no matter how severe the strain or shock, which means a lower cost in your operating expenses, and increases the efficiency of your product. Is this not worthy of a trial?

I noticed in the December, 1913, issue of The Metal Industry that a patent has been issued for the control of lead in copper alloys by the use of galena. This was one of my methods, and while it is very good, does not control lead sweat as well as one of my recent discoveries, and to prove my claim to first using the above method, the samples I sent marked O, and which were described in The Metal Industry of March, 1910, contained 60 parts copper, 35 parts lead, 5 pounds galena. If there is any credit due to recent discoveries and the consequent issuance of U. S. patents, I claim first rights to it, and to bear me out in this the samples are in the office of The Metal Industry. I only write this in case there may be any argument over the issuing of patents on metals of this mixture. The samples I am sending to confirm with my article do not contain any galena.

[The samples mentioned above by Mr. Wright are at the office of THE METAL INDUSTRY and may be seen at any time.—Ed.]

*President Vulcan Alloy Works, San Francisco, Cal.

Associations and Societies

REPORTS OF THE CURRENT PROCEEDINGS OF THE METAL INDUSTRY ORGANIZATIONS.

AMERICAN ELECTRO-PLATERS' SOCIETY

FIFTH ANNUAL BANQUET OF THE NEW YORK AND NEWARK, N. J., BRANCHES.

The fifth annual banquet of the New York and Newark branches of the American Electro Platers' Society was held at the Marlborough-Blenheim Hotel, New York, on February 21. The banquet, which was attended by one hundred and seventy members and guests, was one of the most successful that has been held by the association. The entertainment committee, of which William Schneider was chairman, had made every possible preparation for the entertainment of the members and their guests and it is needless to say that these efforts were greatly appreciated by all who were fortunate enough to be present.

LIST OF EXHIBITS.

A display was made by various firms and platers of electro plating and finishes which included the following: Mr. De Mars, American Writing Machine Company, Newark, N. J., black nickel finish on brass; John J. Moriarty, St. Johnsburg, Vt., black nickel finish on aluminum; W. E. Symonds, of the Lamson Company, Lowell, Mass., finishes in bronze and nickel on aluminum; H. Gleichman, Steffens & Amberg Company, Newark, N. J., nickel on gray and malleable iron; A. H. Wirz & Co., Philadelphia, Pa., deposits of gold and brass Trisalyt and metallic cyanides on lead sprinkler tops; Joseph Walters, Southern Stove Works, Richmond, Va., nickel on cast iron without previous plating; J. Hartnett, Wright Manufacturing Company, Newark, N. J., rose gold, antique and other finishes on ash trays, cigar lighters, etc.; Horace Smith, Tiffany & Co., Forest Hill, N. J., inlaid deposit of silver and copper; John Hassall, Inc., Brooklyn, N. Y., escutcheon pins, rivets, etc., in all metals; Eureka Pneumatic Spray Company, New York, sprayers for lacquers, enamels, etc., including a new model overhead tank spray outfit; C. O. Field, A. F. Meiselbach & Bro., Newark, N. J., reels, etc., in nickel, oxidized copper, zinc, matt and gold finishes; W. J. Schneider, Brooklyn, N. Y., push button plates, steel chains, etc., brass plated with Trisalyt and metallic cyanides, cast iron clock and picture frame finished in gold Trisalyt and metallic cyanides; mesh bags, vanity cases, silver plated with Trisalyt and metallic cyanides from Providence, R. I.; R. Rogg, Premier Metal Etching Company, New York, large clock dial etched and silver plated with Trisalyt and metallic cyanides.

The banquet was preceded by an informal gathering by the members and their friends who thronged the corridors of the hotel exchanging experiences and looking over the collection of finished work that were on exhibition by the members.

The badges used at the banquet were furnished by Maas-Waldstein Company, Newark, N. J., the menu cards and souvenirs by the Celluloid Zapon Company, New York, the Roessler and Hasslacher Chemical Company, New York, furnished the printing; cigars were furnished by the Celluloid Zapon Company, Egyptian Lacquer Company and the Roessler and Hasslacher Chemical Company, while the registration staff and type machine were furnished by THE METAL INDUSTRY.

The banquet itself was presided over by Thomas Haddow, president of the New York branch, who acted as toastmaster for the fore-part of speech making, but, owing to a bad cold, he retired in favor of Horace Smith, president of the Newark branch. The speeches were many and varied. Founder and Past President Charles H. Proctor started the ball rolling with a few appropriate sentences in which he congratulated the society on its marvelous growth and then introduced George B. Hogaboom, president of the general body, who delivered a speech in which he recounted the objects and benefits of the society. President Hogaboom was followed by Professor Weimer, of the Newark Technical School, who spoke at some length on the relation of chemistry to plating. Others who spoke were William App Jones, of the Celluloid Zapon Company, New York; William Schneider, of the Roessler and Hasslacher Chemical Company, New York, and Joseph Walters, of the Southern Stove Works, Richmond, Va. Mr. Schneider's speech was as follows:

GENTLEMEN:—Despite the growing sentiment against after dinner talks in favor of cabarets, and tango exhibitions, I cannot but feel that at functions of this character, where the interests of each and everyone of us are so closely connected, that a few words from different members apropos of their special lines, are not at all amiss. I am grateful, therefore, to the chairman, for affording me an opportunity of expressing my individual views, and will make the best of it, by calling to your attention a matter which I am sure is of deep concern to all of us. I refer to the equipment and maintenance of the plating establishments in the different factories throughout the territory. My business for the past few years has given me an excellent opportunity to see for myself the conditions under which many of our fellow-workmen are obliged to labor.

It is rather hard to understand why the average manufacturer, no matter how progressive he may be, does not give the plating department the attention this very important branch requires. You all know that the average manufacturer will not hesitate for a moment to throw out his entire complement of machinery to substitute newer and more up-to-date types which will cut down the cost of the manufacture of his product. In this line he is entirely satisfied to overlook the first cost as long as he has satisfied himself, in his own mind, that this additional expense will be justified in ultimately decreasing the cost of production or, increasing the output.

The same is true of raw material. The founder specifies certain grades of metal, and he gets it—he specifies the use of alloys which will improve the texture of the castings and reduce rejections to a minimum. Only the plating department has been neglected. You all know of plants where, or you may have even experienced this yourself, recommendations from the plating department are ignored. In the last two years, I have had occasion to visit some of the largest plating plants in the country and have been impressed with this woeful neglect. I know of one instance where the plater has at least a dozen times requisitioned for a rheostat, and the request has just as often been refused, but still this manufacturer expected 100 per cent. efficiency from the plating department. The same is true of the chemicals which are put at the disposal of the plater. He is expected to obtain results with inferior material, notwithstanding his protests, but the time has now arrived when the plater and the department in which he holds forth must come into its own.

The first step in this direction was taken last spring at the meeting of the American Electro-Chemical Society, at Atlantic City, at which time a number of our members were in joint session with that society. Electro-plating was discussed to the exclusion of all other matters. This is the first time that the engineer and the chemist recognized the plater as a professional man, and it is only to be hoped that this feeling of co-operation will continue to grow. But to come back to my original theme—the fact that the plater has been ignored is, in a way, his own fault. He has not been as progressive as he might have been and he has not looked with favor upon products which have been put on the market for his use. He has been willing to go along in a rut until this rut has worn so deeply that it threatened to engulf him, and it was not until this society was formed that the plater was made to realize that he occupied an important place in the various industries of today. Take, for instance, in the chemical line alone. He has for years

FIFTH ANNUAL BANQUET, NEW YORK AND NEWARK, N. J., BRANCHES, AMERICAN ELECTRO-PLATERS' SOCIETY, HOTEL MARLBOROUGH-BLENHEIM, NEW YORK, FEBRUARY 21, 1914.

been satisfied to work with materials of which he did not know, and often did not care to know the ingredients. I am indeed sorry to say that this condition has caused the scrupulous dealer in chemicals to take advantage of the plater by adulterating and mislabeling the various chemicals as put on the market. I need hardly say, a thoroughly reliable and responsible concern would not stoop to such methods, but that it has been done, only proves once more that the plater must take a more active interest in what he buys and where he buys. He must buy according to quality and purity rather than by price. It is easy to understand that adulterated articles can be sold cheaper than the standard product conforming with the United States Pharmacopœia and labeled accordingly. More and more the efficient engineer is looking into the plating problems from a technical standpoint making recommendations which the plater

should not ignore. Of course, a purely technical man may make suggestions which you and I, as practical men, know will not be entirely feasible in actual practice. I do not, for one instant, wish to state that the technical man can displace us, but I wish to impress upon each of you the necessity of being good listeners. We must not shrug our shoulders and talk disparagingly of what the technical man has to say; we should absorb these suggestions and either prove or disprove them in the actual practice. In this way there will be a more harmonious relationship between us and the theorist, and the practical man will come in for his share of consideration.

My company, one of the largest chemical companies of its kind, has realized that the plating art was bound to be raised to a higher level, and is, therefore, doing all in its power to elevate it to the plane it should occupy. In putting our chemicals on the market, we have conformed readily to the dictates of the Pure Food and Drug Act, and have labeled and designated our products accordingly. We are maintaining a research laboratory which has given a good share of its time studying the plating industry and its needs, and have adopted the slogan, "Purity First" and this should be the maxim of every plater and every manufacturer of chemical products. It is to be hoped that this movement will grow from year to year so that the plating industry will be put on a firmer and sounder basis. This, primarily, has been the aim of the American Electro Platers' Society, and that it has met with the approval of the practical man, is best shown by the constant growth of our organization.

Joseph Walters, who followed Mr. Schneider delivered the following address in which he argued that electro-plating is a profession and not a trade.

In the beginning of its art, plating was accomplished by hand-work and heat alone. Thin sheets of a superior metal were soldered to an inferior one, which was called "close-plating," and, while to England belongs the credit of being the mother of plating and of plating dynamos, it remained for America and Americans to bring the art and science of electro-plating to its present standard of efficiency and world-wide importance commercially.

I deem it unnecessary to enter into a discussion of the early history of plating, and will merely say that with the advent of the dynamo, electro-plating, a new industry was born, electricity in combination with chemicals taking place of the hand-work.

Here, too, I will forego the details of the trials and troubles, yet wonderful achievement of the modern plater. But the question presents itself, What is a plater? We hear so much said about the plating-room, its needs and requirements, its proper arrangement, etc. We hear so much of late regarding the importance of the voltmetre and the ammetre in the plating-room, of electricity and chemicals used by the plater, but what about the plater? The man behind the gun, so to speak. Yes, what is a plater? Is he a laborer? A mechanic? In other words, is plating a trade or a profession?

If I were to analyze a plater, I would attach him to one of the poles of a dynamo, immerse him in a solution prepared for the purpose, and the result would be: 25 per cent. electricity, 75 per cent. chemistry.

To find out if plating is a trade or profession, let us examine the utensils, tools and instruments the plater makes use of. First—the dynamo, rheostat, voltmetre and ammetre of the electrical family. Secondly—hydrometer, graduating glass, retort, litmus paper, sulphuric, hydrochloric and nitric acids, cyanides, sulphates and carbonates, etc., instruments of the chemist and substances of the chemical family. Are these tools for work by a man with a trade, or are they instruments and compositions used by a man with a profession? Here permit me to protest against the term "Trade" as applied to the plater. Plating was a trade at its birth only, when it was done by hand-work. Perfected as it is today, with improved appliances, with an exact knowledge of electricity and chemistry, the plater of today is master of a science.

Plating a trade? And I speak with all due regard and respect for the man with a trade—the man who earns an honest living by "the sweat of his brow." The man with the shovel, the pick and the ax is just as important and necessary to the progress of the human race as the greatest lawyer, doctor or any other professional or business man the world ever saw. You have heard the fable, "For the want of a shoe a horse was lost, for the want of a horse a soldier was lost, for the want of a soldier the war was lost." Was it not just as important for the success of the army to have the blacksmith properly shoe the horse, as it was necessary for a soldier and general to lead the army? And I have yet to learn which is the most important to civilization: labor or capital, the mechanic or professional, the priest or layman. "The world is a stage, and all men therein a part have to play." By the laws of God, as citizens of this grand and glorious country of ours, by the Constitution of these United States, all men are equal. It is not degrading, and I do not belittle the man with a trade, but let us call things by their proper names.

Plating is a profession, and until it shall be so recognized, first, by the platers themselves, then by the employers of platers; then, and not until then, can we hope to receive compensation for services adequate and commensurate with other professions, for after all, it's the dollars and cents we are after.

Having established the fact that plating is a profession, I want to impress upon your minds the importance and necessity of specializing. I have long ago realized the futility of mastering all the stored knowledge of every branch of the plating industry. This is an age of specialization. Medicine, for instance, though old as the hills, made little or no progress until physicians became organized and began to specialize. As a result, today we have the eye, ear, nose, throat and what-not specialist, and what is true of the doctor is equally true of the other professions and business, and when plating shall be practised as a profession each branch of electro-plating will become a specialty, and with specialization the standardizing of solutions will naturally follow.

Last year, while on a trip through several states, I visited sixteen stove factories employing nickel platers. Of the sixteen, no two were maintaining their solutions alike; no two were using the same voltage and amperage, and solutions registered anywhere from 5½ to 12 degs. Baumé. The waste of materials in some cases, the unsanitary conditions and impractical methods pursued by others, convinced me more than ever before of the necessity of specialization and of standardizing the different solutions used by the platers.

SOME OF JOSEPH WALTERS' NICKEL PLATING, AS EXHIBITED AT THE ELECTRO-PLATERS' BANQUET.

Having defined what a plater is, that he makes use of two sciences—electricity and chemistry—the proper question would now be, "What is electricity?" This most wonderful of all the forces of nature was one of the carefully guarded secrets of the ancients, and that it is not a modern invention or discovery can be proven by the fact that Thales of Miletus, six hundred before the Christian Era, refers in his writings to the fact that amber, when rubbed, attracts light and dry bodies. The science of electricity dates properly back from the year 1600, when Dr. Gilbert, of Colchester, England, published a book on same, and he is the inventor of the word electricity, which he derived from the Greek word electron, meaning amber.

Otto Van Guerick, of Magdeburg, in 1672, invented the first electric machine ever made, which consisted of a globe of sulphur turned by a handle and rubbed by a cloth pressed against it by the hand. Muschenbrock, of Leyden, in 1774, invented the Leyden jar, which is a glass jar with a coating of tin within and without, closed with a wooden stopper through which passes the stem of a brass knob, and this instrument is used extensively today in connection with static machines as applied to medicine

and surgery. But this science, like all others, the American genius has brought to its present efficiency and greatness, eclipsing all other forces of nature in the hands of man. Our own Benjamin Franklin, in 1752, proved the identity of lightning and electricity by his famous kite experiment. Many were the inventors and scientists in different parts of the world who studied the invisible force called electricity, and I take pride that none measured up to the greatness of our own American discoveries (Yankee ingenuity, if you please) for the importance of the telephone and telegraph; the electric motor and generator and the incandescent lamp being the most wonderful of all human achievements.

We hardly realize the extent of the science or the many uses to which this mysterious force is put. There is scarcely anything that has to be done which is not done electrically—lighting, heating, cooling, lifting, pulling—all are done electrically, and electro-plating can only be done by a proper understanding of electricity. Are you using it like the laborer his tools, or are you making a study of its application in the science of electro-plating?

Now we come to chemistry. What is a chemist? Chemistry, as is true of all other business and professions, has become in recent years divided into a number of branches—chemists, metallurgists, assayers, and electro-chemists. All of the technical lines having to do with manufactured or natural products demand an extensive chemical knowledge. The mechanical engineer, for example, studies applied chemistry with other things he must of necessity understand. The doctor, dentist and pharmacist must understand at least its fundamentals. The manufacturer of medicine and medical preparations and food products must have a thorough knowledge of the subject. The gold, silver and copper miner and manufacturer of metal goods is equally dependent upon the metallurgist. What is chemistry? It has done more and earned more than any other of the scientific pursuits. It has reduced animal culture and agriculture to an exact science; it has secured cures for diseases unheard of fifteen years ago. It has made fortunes from natural and wasted products, and it has done more for the efficiency of mankind through regulation of foods and food values than all the sciences, laws and physicians combined. You have heard the expression, "What a noble profession this or that profession is," but I say that the noblest work of God is a competent chemist.

And to be masters of your profession you must know the chemistry of plating. I want to congratulate those branches of our society, and the members individually who have taken up the study of chemistry. This is an age of progress, and the electroplater who would achieve the highest rung of the ladder of success must keep up with the times. I want to congratulate the Society of American Electro-platers as a whole for the great good it has done and is doing its members. I know of no organization which has accomplished so much in so short a time. Its growth has been wonderful, and benefits to its members great, but let us not rest on the glory already gained—the battle is but begun—a number of improvements need yet to be made.

First: We need a journal of our own—a monthly or weekly, if possible. A stenographic report should be made of every paper presented and discussed by every branch and published in full, so that members of other branches and the isolated plater, who, because of distance cannot attend, will be able to keep up with the progress and results on conclusions reached by the society. As it is now, one branch does not know what the other is doing. Tell me, please, of what benefit is it to read in our Bulletin, or Quarterly, for that matter, that branch so-and-so held an enthusiastic meeting and a paper on "Spotting in Silver-plating" was read and enjoyed by all, or on "Cyanide in Copper-plating," except to the members of the particular branches who were present when the discussions took place.

I believe the society is now strong enough and financially able to publish a journal of its own, and if not, THE METAL INDUSTRY, our next of kin, should be given authority to do so.

Second: Every branch should endeavor by every possible means to establish classes in chemistry, for the knowledge of this science is essential to good electro-plating.

A COMPLETE LIST OF THOSE PRESENT.

	NAME.	STREET.	CITY.
1—J.	Gunther	22 Pine St.	New York City.
	Handy & Harman		Bridgeport, Conn.
2—Jos.	Walters	2019 Park Ave.	Richmond, Va.
	Southern Stove Works		Richmond, Va.
3—Royal	F. Clark	246 Fulton Ave.	Jersey City, N. J.
	Thos. J. Dunn Co.		New York City.
4—H.	Keppler	310 Bainbridge St.	Brooklyn, N. Y.
	Brewster & Sons		Long Island City, N. Y.
5—Horace H.	Smith	11 Terrace Place	Belleville, N. J.
	Tiffany & Co.		Forest Hill, N. J.
6—B.	Popper	505 West 183d St.	New York City
	Egyptian Lacquer Co.		New York City.
7—J. M.	Dunn	487 Wilmot Ave.	Bridgeport, Conn.
	International Silver Co.		Bridgeport, Conn.
8—L. E.	Sturtevant	18 Wilbur St.	Binghamton, N. Y.
	Celluloid Zapon Co.		New York City.
9—George E.	Thomas	757 Broad St.	Meriden, Conn.
	International Silver Co.		Meriden, Conn.
10—F. P.	Davis	721 Carroll St.	Brooklyn, N. Y.
	Celluloid Zapon Co.		New York City.
11—Thos.	Brosman	643 Central Ave.	Bridgeport, Conn.
	E. H. H. Smith Silver Co.		Bridgeport, Conn.
12—Chas. E.	Dunn		Glastonbury, Conn.
	Williams Bros. Mfg. Co.		Glastonbury, Conn.
13—C. H.	Buchanan		Hinsdale, Mass.
	C. U. Ely		New York City.
14—C. C.	Mace	9 Terrace Place	Belleville, N. J.
15—G. H.	Niemeyer		Bridgeport, Conn.
	Handy & Harman		Bridgeport, Conn.
16—Harry De	Joannis		Bridgeport, Conn.
	Brass World		Bridgeport, Conn.
17—C. De	Baun		New York City.
	Egyptian Lacquer Co.		New York City.
18—Dr. N. G	Weber		Perth Amboy, N. J.
	Roessler & Hasslacher Chemical Co.		New York City.
19—C. O.	Field	30 Cortland St.	Newark, N. J.
	A. F. Meisselbeck & Co.		Newark, N. J.
20—W. S.	Elwin	Piersons Court	Bristol, Conn.
	C. J. Root Co.		Bristol, Conn.
21—Geo. B.	Hogaboom	Box 402	New Britain, Conn.
	P. & F. Corbin		New Britain, Conn.
22—George S.	Knecht	4239 North 16th St.	Philadelphia, Pa.
23—Carl	Dittmar	80 Pleasant Place	Arlington, N. J.
	Roessler & Hasslacher Chemical Co.		New York City.
24—T. A.	Trumbour		Butler, N. J.
	THE METAL INDUSTRY		New York City.
25—L. J.	Krom		Plainfield, N. J.
	THE METAL INDUSTRY		New York City.
26—G. W.	Cooper		Jersey City, N. J.
	THE METAL INDUSTRY		New York City.
27—David	Gommoll		Boonton, N. J.
	THE METAL INDUSTRY		New York City.
28—John	Harnett	199 Sussex Ave.	Newark, N. J.
	American Button Co.	Wright Mfg. Co.,	Newark, N. J.
29—J. E.	Sterling	290 East 4th St.	New York City.
30—Wm. J.	Schneider	957 Jefferson Ave.	Brooklyn, N. Y.
	Roessler & Hasslacher Chemical Co.		New York City.
31—Wm.	Fisher	345 East 23d St.	New York City.
	General Optical Co.		New York City.
32—L.	O'Donnell	163 Lembeck Ave.	Jersey City, N. J.
	W. M. Crane Co.		Jersey City, N. J.
33—C.	Frey	Riverside Ave.	Newark, N. J.
	Maas & Waldstein Co.		New York City.
34—A. C.	Plant	22 Young St.	New Haven, Conn.
	Celluloid Zapon Co.		New York City.
35—W. H.	Mintie		New York City.
	F. L. & J. C. Codman		New York City.
36—Philip	Sievering	54 Nairn Place	Newark, N. J.
	Philip Sievering, 255 Centre St.,		Newark, N. J.
37—H. A.	Gleichman	74 South 14th St.	Newark, N. J.
	Steffens-Amberg Co.		Newark, N. J.
38—J.	Gleichman	52 Chadwick Ave.	Newark, N. J.
39—Thos. B.	Haddow	20 Chestnut St.	Newark, N. J.
	Aug. Goertz & Co.		Newark, N. J.
40—Edw. W. T.	Faint	256 Westfield Ave. E.	Roselle Park, N. J.
	The Singer Mfg. Co.		Elizabeth, N. J.
41—Chas.	Skidgell	101 Wilcox Ave.	Meriden, Conn.
	International Silver Co.		Meriden, Conn.
42—Jos.	McCarthy	225 Bunker Ave.	Meriden, Conn.
	International Silver Co.		Meriden, Conn.
43—Bernard	Fahey	1167 Broad St.	Newark, N. J.
	Egyptian Lacquer Co.		New York City.
44—J. F.	Meinke	51 Elm St.	Meriden, Conn.
	Edw. Miller Co.		Meriden, Conn.
45—Thos. F.	Jordan	299 Curtis St.	Meriden, Conn.
	Manning, Bowman & Co.		Meriden, Conn.
46—Frank R.	Gaines	7 Ward St.	Wallingford, Conn.
	R. Wallace & Sons		Wallingford, Conn.
47—John L.	Merigold	419 S. Belmont St.	Newark, N. J.
	Merigold Plating Co.		Newark, N. J.
48—Steven	Masek	1373 Pembroke St.	Bridgeport, Conn.
	Bridgeport Electro Plate Co.		Bridgeport, Conn.
49—W. H.	Betz	935 Madison Ave.	Brooklyn, N. Y.
	E. W. Bliss Co.		Brooklyn, N. Y.
50—D.	Schoonmaker	152 West 98th St.	New York City.
	M. Cohn Company		New York City.
51—Edw. P.	Powell	29 New St.	Meriden, Conn.
	Handel Company		Meriden, Conn.
52—H. A.	Swarz	276 Spring St.	New York City.
	Eureka Pneumatic Spray Co.		New York City.
53—S.	Olsen	276 Spring St.	New York City.
	Eureka Pneumatic Spray Co.		New York City.

54—Chas. H. Proctor..270 Argyle Place.....Arlington, N. J.
Roessler & Hasslacher Chemical Co.....New York City.

55—J. H. Stitt.....New York City.
Roessler & Hasslacher Chemical Co.....New York City.

56—Roy Stout.....47 Coit St.....Irvington, N. J.
Archibald Clement Co.....Newark, N. J.

57—C. G. Keppler.....310 Bainbridge St.....Brooklyn, N. Y.

58—J. A. Straub.....412 East 159th St.....New York City.
R. H. Macy & Co.....New York City.

59—S. Jacobs.....4017 14th Ave.....Brooklyn, N. Y.
Shapiro & Aronson.....Brooklyn, N. Y.

60—C. J. Jacobs.....4017 14th Ave.....Brooklyn, N. Y.
Shapiro & Aronson.....Brooklyn, N. Y.

61—J. A. Stremel.....465 49th St.....Brooklyn, N. Y.
Chas. Schaeffer.....23 John St., New York City.

62—Jos. E. Smith.....61 Columbia St.....Newark, N. J.
R. Neumann Hardware Co.....Newark, N. J.

63—B. Ackerman.....61 Columbia St.....Newark, N. J.
Morehouse Company .....Newark, N. J.

64—N. Barnard.....858 Howard Ave.....Bridgeport, Conn.
Coe-Stapley Co. .....Bridgeport, Conn.

65—Wm. Voss.....202 Hale Ave.....Brooklyn, N. Y.
International Typesetting Mach. Co.....Brooklyn, N. Y.

66—G. Cartlidge.....335 Whaley Ave.....New Haven, Conn.
New Haven Plating & Novelty Co.....New Haven, Conn.

67—Dr. W. A. Jones.....200 Fifth Ave.....New York City.
Celluloid Zapon Co.....New York City.

68—J. P. Orben.....71 Roland Ave.....South Orange, N. J.
Hanson & Van Winkle Co.....Newark, N. J.

69—E. M. Stephanson...100 Oakland Terrace...Hartford, Conn.
Celluloid Zapon Co.....New York City.

70—J. J. Courtney.....239 Winthrop Ave.....New Haven, Conn.
New Haven Plating & Novelty Co.....New Haven, Conn.

71—H. Norton, Jr.....110 N. Whittlesey Ave..Wallingford, Conn.
Wallingford Co. .....Wallingford, Conn.

72—F. Massicotte.....298 Sumpter St.....Brooklyn, N. Y.
Mitchell-Vance Co. .....New York City.

73—H. W. Harvey.....534 Chelsmanford St...Lowell, Mass.
The Lamson Co..... .....Lowell, Mass.

74—W. E. Symonds....26 Chester St.....Lowell, Mass.
The Lamson Co..... .....Lowell, Mass.

75—E. Bintner.....Ave. D & Boulevard....College Point, N. Y.
G. E. Walter.....New York City.

76—Frank Duffy.....276 Devoe St.....Brooklyn, N. Y.
New York Stamping Co.....Brooklyn, N. Y.

77—John J. Fannon...529 6th Ave.....Brooklyn, N. Y.

78—Chas. Cooper.....Glendale (L. I.), N. Y.
Imperial Metal Mfg. Co.....Long Island City, N. Y.

79—A. A. Merz.....962 Forrest Ave.....Brooklyn, N. Y.
Boissier Electric Co.....New York City.

80—Hugh Baxter.....27 North 15th St.....East Orange, N. J.
R. Newman Hardware Co.....Newark, N. J.

81—D. Bush.....240 Snediper Ave.....Brooklyn, N. Y.
Sweeney Mfg. Co.....Brooklyn, N. Y.

82—M. Lewontin.....133 Glenmore Ave.....Brooklyn, N. Y.

83—Ernst Ballin.....New York City.
Celluloid Zapon Co.....New York City.

84—Geo. Roberts.....67 Baldwin Place.....Bloomfield, N. J.
Tiffany Company .....Forest Hill, N. J.

85—F. G. Zingrely.....815 Mt. Prospect Ave..Forest Hill, N. J.
Tiffany Company .....Forest Hill, N. J.

86—C. R. Rierstead....109 Bruce St.....Newark, N. J.
R. Heinisch Sons Co.....Newark, N. J.

87—E. Millwater.....Glendale (L. I.), N. Y.
Greenpoint Metallic Bed Co..Greenpoint, Brooklyn, N. Y.

88—H. Millwater.....Glendale (L. I.), N. Y.
Greenpoint Metallic Bed Co..Greenpoint, Brooklyn, N. Y.

89—C. Habel.....455 East 83d St.....New York City.
Guest.

90—J. L. Souza.....456 East 180th St.....New York City.
Guest.

91—Joseph Godfrey....306 Milford St.....Brooklyn, N. Y.
Shapiro & Aronson.....Brooklyn, N. Y.

92—Jas. Puritan.....3 Cortland St.....New Brunswick, N. J.
New Jersey Lamp & Bronze Co....New Brunswick, N. J.

93—F. F. Pertsch.....Wilson Place.....Belleville, N. J.
Tiffany Company.....Forest Hill, N. J.

94—John Lunsman.....Care of Coleman House..West Orange, N. J.
The Edison Company.....West Orange, N. J.

95—B. J. Owens.....10 Oliver St.....Newark, N. J.
A. F. Conery Co.....Newark, N. J.

96—J. F. Owens.....Newark, N. J.
Hanson & Van Winkle Co.....Newark, N. J.

97—D. B. Smith.....48 11th Ave.....Newark, N. J.
Safety Car Heating Co.....Jersey City, N. J.

98—P. W. Jerram.....26 West Broadway....New York City.
Carborundum Company.....Niagara Falls, N. Y.

99—S. Smith.....397 South 11th St.....Newark, N. J.
Western Electric Company.....Newark, N. J.

100—E. L. Proctor.....Arlington, N. J.
Guest.

101—H. C. Meinke.....74 South 3d St.....Meriden, Conn.
Bradley & Hubbard Co.....Meriden, Conn.

102—A. W. Kantack.....New York City.
Caldwell & Co.....New York City.

103—Wm. B. Wells.....2713 Newkirk St.....Flatbush, N. Y.
Tuttle & Bailey.....New York City.

104—B. E. Holten.....Los Angeles, Cal.

105—H. C. Flannigan.....New York City
Celluloid Zapon Co.....New York City.

106—A. H. Duljie.....84 North 4th St.....Newark, N. J.
Westinghouse Elec. & Mfg. Co.....Newark, N. J.

107—John Griffin .....Newark, N. J.
Sargeant Mfg. Co.....Newark, N. J.

108—Wm. Carr.....Newark, N. J.
H. S. Wyckoff Co.....Newark, N. J.

109—Jos. A. Straub, Jr.....New York City.

110—F. Piske.....775 Lake St.....Newark, N. J.

111—C. Piske.....775 Lake St.....Newark, N. J.

1112—Jos. Gormley.....80 Steven St.....Belleville, N. J.
Alberger Pump & Condenser Co.....New York City.

113—Geo. Girldner.....170 John St.....Belleville, N. J.
Worthington Pump Co.....Newark, N. J.

114—Chas. Drake.....170 John St.....Belleville, N. J.
Blanchard Bros. .....Newark, N. J.

115—A. Leimbacker.....252 Orchard St.....Elizabeth, N. J.

116—A. H. Kemp.....100 Hoe Ave.....New York City
Casualty Co. of America.....New York City.

117—H. S. Wyckoff.....42 South 17th St.....East Orange, N. J.
H. S. Wyckoff Co.....Newark, N. J.

118—C. J. Spelvoe.....34 Halstead Ave.....Irvington, N. J.
Bonney Veshlage Tool Co.....Newark, N. J.

119—T. N. Lalley.....34 Van Rensellaer St..Belleville, N. J.
J. Hays Hammond.....Newark, N. J.

120—J. S. Phelps.....West Caldwell, N. J.

121—O. P. Seher.....104 Montclair Ave.....Newark, N. J.
Maas & Waldstein Co.....Newark, N. J.

122—T. J. Fay.....College Point, N. Y.
American Hard Rubber Co.....New York City.

123—John Painter.....61 Wyckoff St.....Brooklyn, N. Y.

124—Emil Troxler.....1156 South Orange Ave..Newark, N. J.
Eastwood Park Co.....Newark, N. J.

125—John De Mar.....49 Fairmount Ave.....Newark, N. J.
American Writing Machine Co.....Newark, N. J.

126—August J. Frey....638 Park Place.....Brooklyn, N. Y.
Brass Goods Mfg. Co.....Brooklyn, N. Y.

127—Harry Wohl.....129 Louis Place.....Brooklyn, N. Y.
Brass Goods Mfg. Co.....Brooklyn, N. Y.

128—Chas. Ammann.....374 Hawthorne St.....Brooklyn, N. Y.
Brass Goods Mfg. Co.....Brooklyn, N. Y.

129—P. R. Fisher.....Matawan, N. J.
Munning-Loeb Co. .....Matawan, N. J.

130—Professor Weiner.....Newark, N. J.
Newark Technical School.....Newark, N. J.

131—James Leahy.....31 Douglas St.....Brooklyn, N. Y.
Metal Stamping Co.....Long Island City, N. Y.

132—Stanley Shubert....77 India St.....Brooklyn, N. Y.
Schafer & Budenberg Mfg. Co.....Brooklyn, N. Y.

133—H. C. Bernard.....73 Van Buren St.....Brooklyn, N. Y.
City Button Works.....Brooklyn, N. Y.

134—A. Martin.....277 Jamaica Ave.....Astoria (L. I.), N. Y.
John Hassall, Inc.....Brooklyn, N. Y.

135—J. Rohder.....374 Oakland St.....Brooklyn, N. Y.
John Hassall, Inc.....Brooklyn, N. Y.

136—C. Lunbordo.....New Brunswick, N. J.

137—E. McCluskey.....104 West Ave.....Long Island City, N. Y.
John Hassall, Inc.....Brooklyn, N. Y.

138—T. J. Dowling.....147 24th St.....Guttenberg, N. J.
H. S. Wyckoff Co.....Newark, N. J.

139—N. Connell.....651 Park Place.....Brooklyn, N. Y.
W. H. Sweeney Co.....Brooklyn, N. Y.

140—C. J. Schroeder....23 Longworth St.....Newark, N. J.
L. Myers .....Newark, N. J.

141—T. Kreuder.....1180 Broad St.....Newark, N. J.
Schmitz, Moore & Co.....Newark, N. J.

142—L. Le Roff.....1392 S. New York Ave..Brooklyn, N. Y.
New York Metal Works.....New York City.

143—G. Carlson.....389 Fairmount Ave.....Newark, N. J.
L. Myers .....Newark, N. J.

144—W. Brudick.....611 South 19th St.....Newark, N. J.
L. Myers .....Newark, N. J.

145—E. Quimby.....8 St. Edwards St.....Brooklyn, N. Y.
Sweeney Mfg. Co.....Brooklyn, N. Y.

146—J. Hallmann.....638 South 13th St.....Newark, N. J.
L. Myers .....Newark, N. J.

147—H. A. Achorn.....52 West 38th St.....New York City.
Gould-Mersereau Co. .....New York City.

148—Max Ruleman.....800 Rich St.....Newark, N. J.
Aug. Goertz & Co.....Newark, N. J.

149—H. W. Young.....14 Court St.....Newark, N. J.
Shiman-Miller Mfg. Co.....Newark, N. J.

150—Geo. J. Weigand..414 14th St.....West New York, N. J.
Auto Pneumatic Action Co.....New York City.

151—S. V. Williams.....West Orange, N. J.
J. Landsman.....West Orange, N. J.

152—G. E. Osborne.....98 11th Ave.....Newark, N. J.
Whitehouse Mfg. Co.....Newark, N. J.

153—Chas. Scheider.....25 Courtland St.....Newark, N. J.
A. F. Meisselbach & Co.....Newark, N. J.

154—C. Kurfess.....793 18th St.....Newark, N. J.
A. F. Meisselbach & Co.....Newark, N. J.

155—R. M. Viniella.....4 Horatio St.....New York City.
The Messer Co.....New York City.

156—A. J. MacDermitt.....Wyandotte, Mich.
J. B. Ford Co.....Wyandotte, Mich.

157—T. Aitken.....419 West 23d St.....New York City.

158—A. C. Petersen.....Wyandotte, Mich.
J. B. Ford Co.....Wyandotte, Mich.

159—E. McGuirk.....4910 6th Ave.....Brooklyn, N. Y.
Drapery Hardware Co.....Brooklyn, N. Y.
160—G. A. Sturtevant..153 East 51st St.....New York City.
J. Bernard Co.....New York City.
161—S. Friedman.....1158 De Kalb Ave.....Brooklyn, N. Y.
W. H. Sweeney Co.....Brooklyn, N. Y.
162—W. Stremel.....252 Prospect St.....Long Island City, N. Y.
Chas. Schaeffer .....New York City.
163—J. Garaventa.....160 Terrace Ave.....Jersey City, N. J
Chas. Schaeffer .....New York City.
164—W. Shanks.....539 East 87th St.....New York City.
J. S. Cook.....New York City.

The Dayton, Ohio, branch of the American Electro-platers Society held their first annual banquet February 24, 1914. We understand this banquet was a great success, but particulars are not at hand as we go to press.

AMERICAN FOUNDRYMEN'S ASSOCIATION

R. A. Bull, senior vice-president of the American Foundrymen's Association, announces that President Howell has tendered A. O. Backert, of Cleveland, Ohio, the position of secretary-treasurer of the American Foundrymen's Association, and that Mr. Backert has accepted. Mr. Backert will enter upon his duties as soon as Dr. Moldenke completes the current volume of transactions, which work he is now bringing to a close, and will discharge the full duties of the office.

NATIONAL ASSOCIATION OF BRASS MANUFACTURERS

The Association has ordered a new Official Catalog and Price List to be gotten out during the year 1914, and to be ready to issue on the first of January, 1915, and desires that the widest publicity be given to this item, to avoid any misunderstanding on the part of those who may have in mind, getting up catalogs during the coming year. There will be a great many changes in the present lists; many items shown in the present catalog will be removed and not shown in the new issue, and a great many new goods added, prominent among which, might be mentioned the regular standard line of Gas Service and Meter Cocks. This work is now in the hands of the List Committee and information will be transmitted from time to time.

Commissioner William M. Webster has sent out a circular in which he states, in order to correct an erroneous impression which the jobbing trade seems to have entertained, that the new catalog of brass goods, according to previous agreement, will not be issued until January, 1915. This agreement was made at the time the present official catalog was issued on September 5, 1909, when the brass manufacturers agreed with the various jobbing and affiliated organizations that no other change would be made in the lists of brass goods for a period of five years and this agreement has been rigidly kept.

ITEMS OF INTEREST TO THE INDIVIDUAL.

C. S. Weigert has connected himself with and is now representing the Hill & Griffith Co., Cincinnati.

Charles Schutte is now brass foundry foreman at the McNab & Harlin Manufacturing Company, Paterson, N. J.

J. J. Burke is now representing as salesman the Perry Austen Mfg. Company, manufacturers of lacquers, Grasmere, Staten Island, New York.

Henry Wiesner is now connected with the Norfolk Electro-Plating Company, 121 Randolph street, Norfolk, Va., in the job plating business.

Thomas Haddow, formerly with Adolph Neubeck, Inc., Buffalo, N. Y., is now with August Goertz and Company, Inc., Newark, N. J., in the capacity of foreman of their plating and finishing departments.

C. P. Karr, associate physicist of the Bureau of Standards, located at Pittsburgh, Pa., will be transferred to Washington, D. C., on April 1, when his address will be care Bureau of Standards, Division of Metallurgy, Washington, D. C.

H. N. Hudson, formerly vice-president of the Hoyt Metal Company, of St. Louis, Mo., and New York, has become general sales manager of the white metal department of the Great Western Smelting and Refining Company, Chicago, Ill.

E. G. Lovering has charge of the plating department of the Lewis Spring & Axle Company, Detroit, Mich., who have enlarged their plating and polishing department and have every facility to handle all kinds of plating and polishing for the jobbing trade.

George R. Wagner, chief linotype machinist for the New York World, has invented a new linotype alloy which is as follows: lead, 82; antimony, 13; tin, 5 per cent. The advantages claimed for this alloy are that it gives to the slug or type a rigidity greatly in excess of the metal formerly in use and at much less cost of material.

Victor E. Smith, for a number of years foreman of the foundry at the Gorham Manufacturing Company's plant at Providence, R. I., has been appointed superintendent to succeed Fred. C. Lawton. Mr. Smith assumed his new duties on February 2, with the reopening of the plant after the annual two weeks shut down. No successor to Mr. Smith, as foreman of the foundry, has been appointed as yet.

J. M. Litchfield, who has been a salesman for a number of years with the Magnolia Metal Company, New York, has become the Eastern representative of the Electric Smelting and Aluminum Company, of Lockport, N. Y. Mr. Litchfield has offices at 634 Temple Court, New York, and 215 Weld street, Boston, Mass. He will handle the "Eureka" brand of babbitt metal made by the company at their Lockport, N. Y., plant and all of their other well-known metals and alloys.

DEATHS

Edward B. Richter, president of the Richter Company, wholesale manufacturers of plumbing, gas and steam supplies, Cincinnati, Ohio, died suddenly at his office on February 18. Mr. Richter is survived by a widow and son.

Arthur Lewis, vice-president of the Swan and Finch Company, dealers in oils, 151 Maiden Lane, New York, died February 26 at Saranac Lake, New York, where he had been for several months trying to recover from injuries received while playing golf. Mr. Lewis' body was brought back to his home at Clinton street, Brooklyn, N. Y., from which the funeral was held. He leaves a widow.

Trade News

BUSINESS REPORTS OF THE METAL INDUSTRY CORRESPONDENTS AND TRADE ITEMS OF INTEREST FROM THE DIFFERENT INDUSTRIAL CENTERS OF THE WORLD.

WATERBURY, CONN.

MARCH 2, 1914.

Business is improving in the Naugatuck valley, not with a rush, of course, but slowly and surely. Indications now are that the worst of the slump which began last June and reached its height last October has passed and that there will be a gradual and steady resumption to normal activities in nearly all metal lines within the present month. It has been a hard winter for metal workers in this section up to date, and in many instances skilled mechanics were applicants for temporary assistance from organized philanthropic and charitable associations—this in spite of the fact that the workingmen hereabouts had enjoyed probably the most prosperous three years in the history of Naugatuck valley industries up to the recent setback. But that seems to be passing now, and with spring's approach business generally seems certain to improve, as far as the metal industries are concerned.

February has been a month of annual sessions, annual social events and adjustment to new conditions, such as the law forbidding the employment of women or minors more than fifty-four hours a week. These have been accomplished without serious disturbance to the regular course of events.

Several banquets have taken place during the past month, and all have been of the most enjoyable nature. Among the important ones were those of the Foremen's Association of the American Pin Company, at which George A. Driggs, president of the company, was the principal speaker; the Foremen's Association of the Berbecker & Rowland Manufacturing Company, the Foremen's Association of the Plume & Atwood Manufacturing Company, the Foremen's Association of the American Ring Company, the office force of the American Pin Company, and the Eyelet department of the Scovill Manufacturing Company. In addition to the above there were dances by the Employees' Aid Association of the Waterbury Clock Company and the Employees' Aid Association of the New England Watch Company, which company is now defunct and whose affairs are being closed up by the receivers.

One of the principal events of recent years in the social line was an address by George W. Perkins, of New York, before a number of manufacturers at the Home Club during the past month. Mr. Perkins discussed profit-sharing plans, outlining the systems followed by the concerns with which he was connected, the United States Steel Corporation, International Harvester Company and others. He answered numerous questions after the address, and in an interview with the newspapers—whose representatives were excluded during the address—he defended such incorporations as are called trusts, declared he believed the Progressive party the only party that could get the minimum of abuses and the maximum of benefits out of trusts by Federal control, and, when asked what he thought about the present administration's attitude towards big business, replied:

"Did you ever see the play called 'Nellie, the Cloak Model'? It is a frightful thing, in which everybody gets killed off. There is a fellow who throws Nellie over the Brooklyn bridge. She is barely saved, and he explains how he happened to do it. Then he ties her on the railroad ties—and by accident the train is stopped just in time to save her life. He explains again. Then he pushes her into an elevator shaft. She falls thirty stories, but lands on an air cushion, or something, and is saved once more.

"'Nellie,' says the man, 'why should you be afraid of me?'

"President Wilson's attitude reminds me very much of this classic bit of drama. He wonders why big business should be afraid of the government. Now, take his last message on the trust problem, for instance. There is nothing at all constructive in it, and I doubt if it will accomplish much good. It is mostly, I should say, a rehash of Bryan's old theories. That stuff about the interlocking directorate, for example, was trotted out by Bryan in the Taft campaign."

While many of the factories are operating on a five and a half day schedule now, this is an improvement over the conditions throughout most of December and January, when four and five days prevailed in many plants. Most of the branches of the American Brass Company are busier than a month ago and running five and a half days. Forces are still near minimum in all plants. The Scovill Manufacturing Company is not operating as briskly as is its wont, but orders are again increasing in several departments. The Chase plants are gradually increasing forces and hours and both in the Waterbury Manufacturing Company's and the Chase Rolling Mills Company's plants there has been improvement during the month of February, with brightening prospects as the season advances. Most of the small plants of the town are running regularly five days to full time, but with reduced forces.

Since the closing of the plant of the New England Watch Company there have been numerous reports of negotiations for it. Persistent among these is the rumor that the Ingersoll brothers, the watchmakers, with headquarters in New York, but who have thousands of watches turned out in the plant of the Waterbury Clock Company, in this city, have been inquiring about the plant. No disposition of the property has yet been announced. The former mechanical superintendent, Edwin Hart, is now employed by the Connecticut Mill & Supply Company, of Torrington. William T. Walsh, a former foreman in the plant, has gone to the Ingersoll plant in Trenton, N. J. Other employees are now in the Frank Becton Watch Repairing Shop, an experiment in wholesale repairing for jewelers and jobbers, and others are idle.

Safety is one of the slogans heard with increasing frequency in Naugatuck valley shops and, at the recent dinner of the foremen of the American Ring Company, the president of the company, John Booth Burrall, said:

"If any of you men should think of a plan to bring about greater safety, we want to know it, and if it helps to accomplish our ambition of perfect safety, you will be well paid for the plan or the patent."

In connection with the above the death of Albert Koether, aged twenty-two, as the result of injuries received in the plant of the Union Hardware Company, in Torrington, February 15, is of some interest. He had completed work on the chisel rolls in the forge room of the plant. The front of the rolls was guarded. He stepped to the back of the rolls, which were not guarded, to shut off the power and in some unknown way his hand was caught. His cry as it was ground off brought the foreman, Timothy C. Carroll, who shut off the power as quickly as possible, but not before the young man's arm had been ground off almost to the shoulder. The heavy snow storm delayed his transportation to the nearest hospital, in Winsted, and while he remained conscious and displayed great pluck, he was fast losing strength. His arm was amputated at the shoulder when he reached the hospital, but he died a few hours later. There are thousands of factory workers in Torrington and there should be an emergency hospital there, where injured employees of any factory may be promptly and properly treated.

There are few building additions mentioned in this season, but the French Manufacturing Company, of this city, is anxious to get a one and two-story addition completed soon, so it has let the contract. It will be a brick, concrete and steel structure, on a ground plan 80 x 100 feet.

There was a $1,000 fire in the plant of the Seymour Manufacturing Company, at 2 a. m., February 10. The roof was burned off one of its buildings.

Hon. Curtis Guild, last ambassador to Russia from this country, addressed the members of the Waterbury Club here last week on American opportunities in Russia. He pointed out that

at the time when American manufacturers were looking for Russian business, on account of tariff adjustments, the treaty between this country and Russia was abrogated on account of the anti-Semitic provisions. France and England both have similar provisions in their treaties with Russia, he said, but they refused to abrogate them on that account. The result was a well defined hostility against Americans and American products. This must have its effect locally, he pointed out, because American hardware, much of which is made in Connecticut, has always been preferred to that of other nations by the Russians. He indicated that the Russian field could be made profitable by American manufacturers.

It is not known at this time whether or not any effect has been yet felt here from the operation of the French tariff. There are discriminations of a sweeping nature in the new tariff against cheap watches, and the tax of from 200 to 300 per cent. of the value of watches made in the United States has practically closed the French market against American watches, it is reported from abroad. Up to date the local watch industries, barring the New England Watch Company, have been thriving.—F. B. F.

BRIDGEPORT, CONN.

MARCH 2, 1914.

The return to normal business conditions, although sure, appears to be rather slow and the opinion of a great many men seems to be that there is much idleness, especially among the unskilled men, whom one sees idling about the city or congregated in cafes and boarding places. Although the price of raw products is unquestionably rising and orders are undoubtedly being placed, still several local concerns are running and have been running on reduced force for some time.

It is undoubtedly true that the pounding which the New Haven R. R. has received, with the fear that it is in for more, has had its effect on the business men of this section of the State. When the fortunes of the railroad begin to revive it is expected that they will respond. The industrial leaders are playing a waiting attitude in order to see what will happen under the new tariff policy to which they have hardly had time to adapt themselves. Practically all of the producers have made a success under high protection and now they must see what can be done on the new order, and there are many who predict good times, especially among the hardware concerns. According to Frank G. Drew, a prominent manufacturer of New Haven, "The outlook is very encouraging."

The decision of the Interstate Commerce Commission to suspend the 5 per cent. rate increase until September 12 was disappointing to the metal trade, as they feel that it came at an inopportune time when the general optimism which prevails needed something in a material way to back it up. At the present time it is felt that Congress is not doing anything to assist business by its attitude of trust busting and investigations. Some securities have slipped back into the rut, but it is hoped they will revive on the strength of the report that President Wilson will endeavor to secure an earlier decision from the commission. If the railroads are delaying their buying until they are allowed increased rates, they may find the price of raw materials considerably advanced. The heavy storms, coupled with two holidays the past month, also had its effect in tying up local business to some extent.

The aluminum foundries, while still running with reduced forces, report the outlook as extremely bright for the spring months, with several large inquiries for castings from automobile and auto parts concerns throughout the East who are doing a much better business the last two months. The aluminum market is in a rather stagnant condition with few inquiries. The automobile factories are running full time and appear to be getting busier as spring advances. Manufacturers of automobile and bicycle lamps, parts, etc., are reported very busy and are generally optimistic. Automobile dealers and agents are doing a remarkably good business, some even reporting that they are exceeding last year's business at this time.

The electrical goods factories are still in the slump of the last few months and although they have no doubt that business is improving, still it will not bring them much increase until the latter part of the summer, as they are approaching the quiet period. Compared with last month, however, it may be said that there is an uward trend, as predicted in these columns several months ago. The jobbers of electrical supplies are encouraged about the spring business and express no doubt that building will be brisk, thus bringing them substantial orders. Money being somewhat easier will also liven the contracting lines.

Builders of gas engines and machinery are still running with reduced forces and are uncertain what the future will hold out. The prospects are reported as much better than last fall, however.

The American Brass Company, of Waterbury, Conn., has paid the Bullard Machine Tool Company, of Bridgeport, $40,000 for a tract of land on the Housatonic river in Stratford, near the N. Y., N. H. & H. R. R. It is to be used for a storage and receiving plant from which to distribute raw materials to the American Brass plants in Ansonia, Waterbury and Torrington. Docks, coal pockets, lumber sheds and storage buildings will be built and later a manufacturing plant is likely to be added. A branch line of the railroad will be built to take care of the shipment to these plants and the raw material will be brought in by water. It is claimed a large saving will be effected in transportation of coal and lumber by the water route. This is only part of the recent expansion of the Brass company, who are spending much money in Ansonia and Waterbury.

The sixth annual banquet of the Manufacturers' Association was held on February 19 at the Stratfield Hotel with 340 members present. It was addressed by Howard Elliot, chairman of the New York, New Haven & Hartford R. R. Company on the gigantic problems confronting his corporation, and was an appeal for the support of the manufacturing interests. Gov. Baldwin, of Connecticut, also spoke and in his talk scored government ownership of railroads, saying it was another step toward socialism.

The American Cyclecar Company, makers of the Trumball car also, filed a certificate of incorporation with a capital of $300,000 and $170,000 paid in. The incorporators are: Alex. H., Isaac B., and Frank S. Trumball. The first two mentioned are connected with the Connecticut Electric Mfg. Company. They propose to make 10,000 cars and delivery is promised for April 15. A new factory of brick, 150 x 50 feet and 4 stories high, is to be erected.

The Sprague Meter Company, manufacturers of gas meters, will shortly move to Stratford, where they have purchased sixteen acres of land. They will probably erect a factory building there.

A suit for $50,000 has been started by Yale & Towne, of Stamford, Conn., against the Graham Manufacturing Company, of Derby, alleging that they have imitated Yale locks.

The Union Metallic Cartridge Company are beginning to replenish their stock, which had become greatly depleted during the slack period, and are now running until 9 o'clock at night. It may be necessary to work longer hours, but the force will probably not be increased. Rumors to the effect that they had received orders from Mexico for 300,000,000 rounds of ammunition were partially denied, but it is understood that they have secured a large contract.

The plant of the United Foundry and Machine Company, which went into the hands of a receiver last month, is for sale by a local company, as the owners have decided to discontinue the manufacture of brass, bronze and aluminum castings.

A receiver has been appointed for the Stamford German Silver Company, capitalized at $150,000, which was organized a year ago to make bars and plates of German silver. Their plant is valued at $75,000.

J. M. Murphy, of the National Electro-Process Company, exhibited an electrode made of an aluminum alloy before the members of the Board of Trade. Many wonderful things are claimed for this electrode, such as aging whiskey, purifying milk and clarifying water. He also exhibited spoons made of an aluminum alloy which had the appearance of the best silver and were cheap and durable. It is asserted the company has an order for 40,000 gross of them a year. A plant for the manufacture of these products will be built here similar to the one in Los Angeles, which is capitalized at $50,000.—F. H. C.

NEW BRITAIN, CONN.

MARCH 2, 1914.

A feeling of much greater optimism prevails among New Britain's manufacturers for the coming spring. That this feeling is not without foundation is evidenced by the increase in business noted in all the factories during the past month, by the fact that two of the largest concerns have greatly increased their capital stock in anticipation of doing a rushing business this summer, and by the fact that several of the concerns have gone onto a fifty-five hour schedule instead of a fifty hour schedule, which has been in vogue all winter—to say nothing of the much more cheerful manner in which the questions of the METAL INDUSTRY correspondent are answered. Present prospects are for a brisk spring and summer business. The factories are well provided with work and the local industrial world is resuming its stride after the falling off at the beginning of the year.

Both the P. & F. Corbin division of the American Hardware Corporation and the Landers, Frary & Clark Company have again put on their full force of men and are working fifty-five hours per week and at the George E. Prentice Manufacturing Company, high quality buckle makers, three shifts of men are working eight hours per day. Even then the concern cannot keep abreast of its orders. This plant is a good example of New Britain's industrial growth. Organized only a couple of years ago the business has made good from the start and at the annual meeting it was suggested that the capital stock be increased. The officers are at present looking for a new building, about 100 men being employed at present and the foreman has to do the "grapevine" in going about the shop in order not to step on his men.

New Britain sprung a great surprise in the metal manufacturing world during the last two weeks when two large concerns increased their capital stock. At the annual meeting of the stockholders of the Stanley Works, makers of butts, hinges and cold rolled steel, it was voted to increase the capital stock of the concern from $2,000,000 to $2,500,000. The growth of this plant has been phenomenal since its organization in 1852. The local melon crop was further augmented when the stockholders of Landers, Frary & Clark voted to declare a stock dividend of 100 per cent. by doubling the capital stock, making it $4,000,000 instead of $2,000,000. The doubling of the stock has been made possible through the large surplus, said to be $3,000,000. The increase in the capital was effected by transferring $2,000,000 from the surplus to the capital assets.

REPORT OF AMERICAN HARDWARE COMPANY

During the past year the American Hardware Corporation, New Britain, Conn., earned $1,046,669. From the twelfth annual statement the following table has been arranged by the directors.

ASSETS.

Cash	$496,418.45
Bills and accounts receivable	2,596,192.50
Real estate, tools, machinery, etc.	5,523,621.45
Materials and merchandise	3,980,411.56
	$12,596,643.95

LIABILITIES.

Capital stock	$12,500,000	
In treasury	$2,580,000	$9,920,000.00
Bills and accounts payable		816,087.65
Dividends declared payable Jan. 1		173,600.00
Surplus		1,686,956.30
		$12,596,643.95

William L. Humason, president of the Humason & Beckley Company, cutlery manufacturers, has purchased the Peck & Young Company, of Forestville. This plant makes springs and brass turned work. The firm is authorized to issue capital stock to the amount of $75,000, but it is understood that only $26,000 has been issued. Mr. Humason has been elected president. At the annual meeting of the stockholders of the Traut & Hine Manufacturing Company, F. L. Traut was elected as vice-president to succeed A. C. Sternberg. Ernest N. Humphrey was appointed general superintendent.

On the whole it may be said with honesty that optimism is the keynote of the local manufacturers. After a period of stagnation renewed confidence is being shown and dealers in local stock, Ricter and Company, look forward to a booming spring.—H. R. J.

PROVIDENCE, R. I.

MARCH, 2, 1914.

There has been a slight gain in the volume of business among the metal trades lines in this vicinity during the past month, although the increase has not been sufficient to convince several of the manufacturers that they are justified in running even the forty-five hours a week that is the prevailing schedule. Some of the concerns report that they anticipate having a good business within a few weeks and, generally speaking, there is a very optimistic feeling.

The situation in the manufacturing jewelry industry is about the same that it has been for the past three or four months and there is little in sight to convince anyone that there will be any marked improvement for some months to come. Several of the manufacturers report a better business than they have enjoyed for some weeks, but the greater majority of the concerns are working on a greatly reduced schedule of hours with much reduced force of workmen. Among the jewelers there does not seem to be so much of a lack of confidence as there is of a waiting policy to see what is to be the outcome of the changes brought about by the adoption of the administration measures of tariff reform and currency changes.

H. J. Astle and Company have been busy installing complete new outfits in the shops of Martin, Copeland and Company and the Bassett Jewelry Company, manufacturing jewelers, in the Manufacturers' building, Sabin street, which were burned out last month. These outfits include polishing systems, coloring plants and sand blasts.

The directors of the Manufacturing Jewelers' Board of Trade, elected at the annual meeting in January, met the first Monday in February in accordance with the bylaws at the rooms of the association in the Wilcox building, this city, and organized by the election of the following officers for the ensuing year: President, Frederick D. Carr; vice-presidents, Charles A. Russell and C. J. McClatchey; secretary and treasurer, Marcus W. Morton; Manager, Horace M. Peck; executive committee, Frederick D. Carr, Alfred K. Potter and Frederick A. Ballou. Auditing Committee, L. H. Bosworth, C. J. McClatchey and Edward B. Hough.

At the annual meeting of the stockholders of the Nicholson File Company satisfactory reports were made by the several officers following which the directors were elected to consist of Samuel M. Nicholson, Marsden J. Perry, John R. Gladding, George Nicholson, Paul C. Nicholsen, Walter W. Griffith and Byron S. Watson. Subsequently the officers were elected as follows: President and general manager, Samuel M. Nicholson; vice-president, Paul C. Nicholson; treasurer, George Nicholson; secretary and assistant general manager, Walter W. Griffith; assistant treasurer, Henry W. Harman; assistant secretaries, Harold C. Field and Augustus E. Saunders; assistant to president, Ernest S. Craig.—W. H. M.

ROCHESTER, N. Y.

MARCH 2, 1914.

This city is fast becoming a very important center for the manufacture of all metal lines and is especially strong in brass, bronze, copper, etc., and is improving very much in gold, silver, aluminum, tin, etc. These lines show enlargements every year and new ideas are being put into effect. The plating trade is strong and is in a good condition. This city is particularly interested in the manufacture of metal stampings, optical goods, cameras, scientific instruments and is growing as a center for making badges, medals, novelties, etc. There is not much platinum used here. The gold and silver jewelry and allied lines are on the increase. The Chamber of Commerce is strong and very active in bringing new industries to the Flower City, having good water power, and there is a spirit of co-operation among the members. The city is well advertised and the public spirited men are always working for Rochester.

The Aluminum Company of America, the Northern Aluminum

Company and the United States Aluminum Company have moved from the Powers building to 1111 Granite building, which is the local sales office, in charge of George J. Stanley.

Everett Grable has established an office at 912 Granite building, representing the Aluminum Cooking Utensil Company, of New Kensington, Pa. He has the agency for New York State.

J. A. Carroll, who was with the Yawman & Erbe Company, has bought the Tucker Plating Works, at 14 Commercial street. He is enlarging same and may manufacture same lines.

The Central Foundry has erected a new brass and aluminum plant at Syracuse, N. Y.

The Rochester Brass & Wire Works Company have gone into the making of theatrical brass work and have also done a big business in fence wire. A steady increase in business is reported.

The Genesee Plating & Machine Works have moved from 18 Cortland street to North Water street.

The Ryede Specialty Works, at 177 West Main street, now have a fine plant to turn out all kinds of specialty lines. They are busy, have made great improvements and have a very modern plating plant.

George J. Chandler has become a partner in the Standard Plating Works with A. Bannister, at 134 St. Paul street. Business is on the increase with them.—H. S.

BUFFALO, N. Y.

March 2, 1914.

Of interest to the many readers of METAL INDUSTRY, and perhaps more so to the numerous men of Buffalo, N. Y., and vicinity interested in the copper industry and its products, is the somewhat surprising, if not sudden, announcement that the long established and old reliable smelting concern, the Buffalo Smelting Works, the local and only eastern branch of the Calumet & Hecla Mining Company, which has conducted a successful branch plant here for the past 22 years, has practically decided to remove from the plant, which has been the scene of its activities for so many years, to the town of Hubbell, Mich., situated in the heart of the copper country, from which comes its crude product, thereby greatly facilitating the business in which it is engaged—becoming again part and parcel of that great parent body, the Calumet & Hecla Mining Company.

While the announcement is regrettable locally, and while Buffalo may lose this thriving industry, the good wishes of all who have in any way done business with this concern go with it to its new home, with the hope that it may continue to prosper there as it has here for so long a time.

The decision to locate in Hubbell, Mich., was reached following the untimely death of the energetic and popular manager of the local branch, Mr. Maurice Patch, who had been at the helm of this successful industry for the past 22 years, endearing himself not only to those with whom he had come in contact in a business way, but also with the multitude of acquaintances which he made while serving the City of Buffalo as one of its Park Commissioners and chairman of the Grade Crossing Commission, both positions which he filled with honor and credit until the time of his death, which occurred recently, at the age of 61 years.

Situated on the banks of the Niagara River at the foot of Hertel avenue, the branch plant of the Calumet company, known as the Buffalo Smelting Works, has for a long period of time conducted the business of smelting copper, whose finished products have found their way to all parts of the compass.

At the intersection of Seneca and Pearl streets, and now situated in its new offices, will be found the large mill supply house of the Hendee-Connor Co., dealers in mill supplies on a large scale. The firm, originally located on Seneca street, recently found it necessary to enlarge its quarters, and accordingly alterations were made making an L-shaped store, with the original entrance on Seneca street and the new one at 60 Pearl street, connecting at the rear, where it is now comfortably housed and ready to carry on its business of mill supplies. The firm makes a specialty of belting for every purpose, hose, pulleys, shaftings, hangers, waste, etc., wire-drawn Tungsten lamps, novelty high efficiency lamps, chain hoists and cranes, Jeffrey elevating, conveying and power transporting machinery, buckets, chains, etc.—P. S.

PHILADELPHIA, PA.

March 2, 1914.

The metal markets of this vicinity have not improved materially during the past month. A number of orders, however, are reported to have been placed on cornice copper, but building operations are at a standstill, due to the inclemency of the weather. But as a whole copper and brass are moving exceptionally slow. One large concern here reports that while they have received practically no city business, they were awarded several large orders from the middle west and south that will keep them busy for some time to come. It is believed that the opening up of the markets in other cities will have a tendency to improve local conditions. The retail jewelry business is at a standstill, due to the season. The manufacturers are making up Easter goods, but there is no real demand at present.

The question of legislation regarding the large increase in the number of old gold dealers in this city and elsewhere is giving Captain Cameron, of the local city hall detective force some concern. The captain purposes to bring the old gold dealers under the same regulations which govern pawn dealers, and compel them to make reports at the end of the day of the gold articles purchased. This, Mr. Cameron claims, would put the police on the track of thieves and burglars who use the dealers to cover up their crimes. The dealers find a market for their goods with the United States Government, which buys the precious metal in $100 lots for use in the mint. The gold is often melted within a few hours of the time it is received, thus articles stolen are disposed of in this way without any danger of being brought to the door of the offender.

The profits are large and there are about 200 dealers in this city. There are many honest ones in the business, Mr. Cameron claims, and a number report anything suspicious, but others are simply aids to thieves who take advantage of their desire to get rid of the articles for their own gain.

The illness that threatened the life of N. A. Watson, of the N. A. Watson Brass Works, Erie, Pa., is slowly responding to treatment and it will not be long before he will be around again.

At a recent meeting of the J. B. Brill Company, R. L. Montgomery and Thomas New Hall were re-elected directors. Edmund F. Krewson, who three years ago retired from the active management of the R. D. Wood & Co. here, died on February 9 at the ripe age of 86.—P. N. S.

COLUMBUS, OHIO

March 2, 1914.

The metal market in Columbus and in fact all parts of central Ohio is marking time as it were. The severe cold snap has stopped activities in many ways and as a result the volume of business is not as large as could be expected. But this condition is believed to be only temporary and better things are anticipated in the future. According to those engaged in the trade the outlook for the year is good in all lines of metal and a better market is expected as soon as winter breaks. This is especially true of the automobile industry and also in sheet metal lines. Brass is expected to move better in the near future. The weakness of early in the year is gradually passing away in spite of the rather unfavorable weather. The trade generally is optimistic and preparations are being made for as good a year as in 1913.

Copper is weaker although the local market does not show the weakness of the New York market. Lake copper is quoted at $14.75 to $15 to the trade. Scrap in crucible shape is sold at $14 to $14.50. Brass is holding up well under the circumstances. No. 1 red scrap is quoted at 12 to 13 cents and yellow brass is sold at 8 to 8½ cents. Aluminum is weak and not inclined to rally. Babbitt is moving very good for the season.

The C. R. Breuer Smelting and Refining Company, of Cincinnati, has been incorporated with a capital of $50,000 to do a general smelting and refining business. The incorporators are Frederick Eggard, Joseph P. Feister, Charles O. Bryson, C. R. Breuer and C. J. McDearmitt.

The Cleveland Electro Metals Company, of Cleveland, has increased its capital from $20,000 to $150,000.

The A-1 Metallic Products Company, of Cleveland, has been incorporated with a capital of $10,000 by James C. Thatcher and others.

Attorney Arthur Spangenberg has been appointed receiver for the Richter Company of Cincinnati, brass manufacturers. The claim is made that the recent death of Edward Richter left the concern without a head. The assets are given at $50,000 and the liabilities at $90,000.—J. W.

NEWS OF THE METAL INDUSTRY GATHERED FROM SCATTERED SOURCES

Krementz and Company, Newark, N. J., jewelry manufacturers, operating gilding and plating rooms, are making a few minor alterations in their plant on Chestnut street.

The Metzger Sheet Metal Works, Kalamazoo, Mich., report that their loss by fire published at $10,000 was not nearly so much, being only $1,000, which was fully covered by insurance.

The published report that the Ohio Galvanizing and Manufacturing Company, Niles, Ohio, were to have plans prepared for the erection of a new plant is stated, by the company, to be premature.

The Baltimore Tube Company, Baltimore, Md., announces in this issue that they are now manufacturing seamless brass and copper tubing. They have a thoroughly modern and completely equipped plant.

The French Manufacturing Company, 128 Robbins street, Waterbury, Conn., manufacturing brass and copper tubing, has awarded the contract for the construction of a new two-story shop, 80 x 110 feet.

The Rutland Foundry and Machine Company, Rutland, Vt., has been organized with Rutland men as the interested parties. As soon as the weather will permit the company will begin work on a machine shop.

The Adams Manufacturing Company, Reading, Pa., operating polishing, special hardware and pattern departments, will build an additional story to their building and also begin the manufacture of automobile supplies.

The Benedict Manufacturing Company, Syracuse, N. Y., is completing plans for the erection of an addition to its flatware factory, which will probably be started April 1, and which will give the company 50 per cent. greater capacity in the manufacture of this line.

The George S. Kelley Company, Providence, R. I., has recently acquired the electro-plating plant owned by Herbert E. Brown of that city, which they will use in connection with the manufacture of cheap jewelry. They will also do electro-plating in all branches for the metal trade.

The Aluminum Company of America, located at Massena, Pa., announces that their permanent working force when they open up in the spring will be 2,000 and more probably 2,500, and it is reckoned that at least 500 new houses will be needed in the place to meet the demands of the people who are going there.

H. A. Astlett & Co., 117 Pearl street, New York, who represent the Bates & Peard Annealing Furnace Company, of England, and other high-class manufacturers, are prepared to act as agents for other foreign manufacturers. Their connection with the rolling mills and metal trades enables them to offer unusual inducements.

Brown & Dewitt, 136 Liberty street, New York, announce that they are the successors of the B. O. Bowers Company, chemical department, New York, as sole licensees of Walberg & Co., Ltd., Paris, France, for the sale of Persels nickel salts and other materials for plating and finishing purposes, manufactured by Walberg & Co.

The Coe brass branch of the American Brass Company, Torrington, Conn., will dismantle the four buildings now standing on the site to be occupied by a new foundry. The company also plans to build a tube mill which will be approximately twice the size of the present mill and the rod department will be moved to the present tube mill building.

The Lignum Chemical Works, manufacturers of all kinds of sawdust for platers and for special purposes, Brooklyn, N. Y., whose plant was recently destroyed by fire, report that their office will be temporarily located at 909 to 913 Grand street, Brooklyn, N. Y., and that all future communications, until further notice, should be sent to the above addresses.

The annual meeting of the stockholders of the H. Mueller Manufacturing Company, Ltd., Sarnia, Ont., Canada, was held on February 3. The capitalization of the stock has been increased from $300,000 to $500,000 and they have placed orders for new machinery and equipment to cost $25,000 and which is to be installed at once in order that the company may keep pace with their rapidly growing business.

The Remington Typewriter Company, Ilion, N. Y., announce that all purchases for the Remington Typewriter Works, Ilion, N. Y.; Smith Premier Works, Syracuse, N. Y.; Monarch Typewriter Works, Syracuse, N. Y., and the Yost Typewriter Works, Bridgeport, Conn., will be made at the Buyer's Office, 114 Gifford street, Syracuse, N. Y., and all correspondence relating to buying should be addressed to the Remington Typewriter Company, Factory Buying Office, 114 Gifford street, Syracuse, N. Y.

Since the fire on February 12 which destroyed the white lead manufacturing plant of Hammar Brothers, of St. Louis, Mo., this company has secured, by lease, one of the surplus plants in St. Louis of the National Lead Company. As the latter company is the only concern in the country able to handle the business of so large a competitor as Hammar Brothers, its action in coming to the rescue of its competitor is a pleasant reflection on the relations of big business at the present time.

The Sandusky Foundry & Machine Company, Sandusky, Ohio, states that it is now the manufacturer of the largest seamless brass and bronze tubing in the world, sizes running from 6 in. in diameter, with 3/16-in. walls, up to 22 in. in diameter with 3/16 to 3 in. walls. The company further states that, as far as it knows, it is the only concern in the world able to make seamless tubes commercially of genuine bronze. The advantage of its method of manufacture is that it is able to furnish material in any of the range of sizes specified on short order.

The Aluminum Goods Company, Two Rivers, Wis., is about to award contracts for the construction of another large three-story addition for the buffing and finishing departments. The company is placing the finishing touches on the new rolling mill. A 500 h. p. turbine with direct-connected generator is being installed in the new power plant and the old 250 h. p. power installation will be used to drive the rolling mill. The remainder of the plant will be electrically driven by individual motors. The completion of the improvements will mean the doubling of the former output. The headquarters of the company are at Manitowoc, Wis., and they also have a large plant in Newark, N. J., where they intend to erect a new building 60 x 220 feet, four stories high, some time during the year.

VULCAN DETINNING REPORT

The Vulcan Detinning Company, New York, reports for the year ended December 31, 1913: Sales $740,254; increase in inventories $36,801; total production $777,055; cost of materials, operating expenses, renewals, etc., $961,639; office expenses $29,695; deficit $214,280; miscellaneous income $710; final deficit for year $213,570. The earnings for the last quarter of the year were: Sales $207,991; increase in inventories $6,272; total production $214,263; cost of materials, office expenses, etc., $265,969; deficit $51,706; miscellaneous income $371; final deficit for period $51,335. The following statement of surplus for 1913 is given: Surplus December 31, 1912, $478,796; recovered from American Can Company $617,000; less legal and other expenses $83,739; net from Can company settlement $533,261; total surplus $1,012,057; deductions, loss on year's operations $213,570; loss on securities $1,062; reserve for unsettled claims $2,500; depreciation $38,794; preferred dividends $341,250; total deductions $597,176; surplus December 31, 1913, $414,881.

REMOVALS

The Vulcan Detinning Company, New York, N. Y., announce the removal of their main office to Sewaren, N. J., and request that all communications be sent to that address.

Victor Newman, Newark, N. J., who makes a specialty of gold plating, has moved his plant from 123 Mechanic street, to 8 Academy street. Mr. Newman also specializes in silver plating and coloring of metals.

A. C. Dallas and Son, Inc., Chicago, Ill., moved into their new building, 223-231 North Jefferson street, where they will carry a complete stock of brass and copper sheet, rod, wire and tubing, and will also extend their manufacturing department.

BUSINESS TROUBLES

A temporary receiver has been appointed for the Stamford German Silver Company, of Stamford, Conn. Howard J. Curtis, judge of the Superior Court, on February 13 appointed Clarence W. Bell, Darien, Conn., temporary receiver under a bond of $25,000 in answer to a petition joined in by James G. MacKay, William B. Beckley, Edwin P. Jordan, Homer D. Bronson, Watson A. Jordan, David W. Sharpe and Henry J. Warren against the Stamford German Silver Company.

CHANGE IN FIRM NAME

The Henderson Foundry and Machine Company, Toronto, Ohio, has changed its name to the Toronto Foundry and Machine Company. This company has also taken over the Tri-State Foundry and Machine Company, of New Cumberland, W. Va., and will continue to operate both plants, with the main office at the Toronto factory. The company operates a brass foundry and machine shop.

INCREASE IN CAPITAL STOCK

The Waterbury Clock Company, Waterbury, Conn., has doubled its capital, bringing it to $4,000,000.

The Stanley Works, New Britain, Conn., have increased their capital from $2,000,000 to $2,500,000. The above company operates a plating plant in New Britain and a foundry at their Bridgewater, Mass., branch.

The West Bend Aluminum Company, West Bend, Ind., has increased its capital stock from $50,000 to $75,000, and will erect a new factory for the manufacture of kitchen utensils and specialties in the spring. The building will be 60 x 250 feet, two stories and have a separate power house.

ELECTION OF OFFICERS

At the annual meeting of the Stanley Manufacturing Company, Dayton, Ohio, the following officers were elected: N. M. Stanley, president; George F. Stanley, secretary and treasurer; W. R. Williams, manager for Great Britain. This company manufactures patented metal adhesive embossed labels, seals and initials.

At the annual meeting of the Catskill Foundry and Machine Company, Catskill, N. Y., the following officers were elected: Edgar Washburn, president; James P. Philip, vice-president; George Van Tine, treasurer and general manager; Edgar D. Washburn, secretary and assistant treasurer. The above company operates a brass foundry.

At the annual meeting of the stockholders of the American Brass Company, at Torrington, Conn., on February 3, the following directors were elected: Charles F. Brooker of Ansonia, James S. Elton of Waterbury, Alfred A. Cowles of New York, Arthur C. James of New York, Gordon C. Burnham of New York, John J. St. Clair of New York, Edward Holbrook of New York, Edward L. Frisbie of Waterbury, John P. Elton of Waterbury, C. H. Dodge of New York, Thomas B. Kemp of New York, T. Brownell Burnell of London, England, John E. Wayland of New York, James A. Doughty of Torrington, John A. Cole, Jr., of Waterbury. The directors subsequently elected the following officers: President, Charles F. Brooker of Ansonia; vice-presidents, Edward L. Frisbie of Waterbury, John A. Cole, Jr., of Waterbury, Alfred A. Cowles of New York, Thomas B. Kemp of New York; treasurer, John P. Elton of Waterbury; assistant treasurer, George E. Cole; secretary, Gordon W. Burnham of New York; assistant secretary, Franklin E. Weaver of Waterbury.

GOVERNMENT NEEDS

Proposals will be received at the Bureau of Supplies and Accounts, Navy Department, Washington, D. C., until 10 o'clock a. m., March 24, 1914, and publicly opened immediately thereafter, to furnish at the navy yard, Mare Island, Cal., etc., a quantity of naval supplies, as follows: Sch. 6444: Bituminous solution, thinner and enamel.—Sch. 6445: Bituminous enamel, bronze rod.—Sch. 6446: Valves. March 31: Sch. 6482: Alcohol asphaltum varnish, lamp black aluminum paint.—Sch. 6485: Copper hose. Applications for proposals should designate the schedules desired by number. Blank proposals will be furnished upon application to the navy pay office, San Francisco, Cal.; Seattle, Wash., or to the Bureau.

T. J. Cowie, Paymaster General, U. S. N., 2-21-14.

INCORPORATIONS

Business organizations incorporated recently. In addressing them it is advisable to include also the names of the incorporators and their residence. Particulars of additional incorporations may frequently be found in the "Correspondence" columns.

To manufacture stamping tools, dies and other machinery.—The Lansing Stamping and Tool Company, Lansing, Mich. Capital, $40,000. The company will take over the Capitol Engineering and Tool Company and part of the business of the Sanitary Iceless Packer Company, both of Lansing. J. E. Brigham is general manager.

To manufacture brass and other metal goods.—The Continental Brass and Foundry Company, St. Louis, Mo. Capital, $25,000. Incorporators: G. D. Klemme, Belleville, Ill.; Joseph Messmer, Kirkwood, Mo.; Lewis F. Ostrander and Ferd. Messmer, St. Louis, Mo. The company will operate a brass foundry, finishing and plating shop.

INQUIRIES AND OPPORTUNITIES

Under our directory of "Trade Wants" (published each month in the rear advertising pages), will be found a number of inquiries and opportunities which, if followed up, are a means of securing business. Our "Trade Want Directory" fills wants of all kinds, assists in the buying and selling of metals, machinery, foundry and platers' supplies, procures positions and secures capable assistants. See Want Ad. pages.

PRINTED MATTER

Metal Review.—Compiled by C. Mayer, secretary, the New York Metal Exchange has issued a statistical review of the domestic and foreign metal markets together with the annual statistical report of the New York Metal Exchange for 1913.

Metals.—George S. Youngs, dealer in ingot metal and copper residues, Bridgeport, Conn., is sending out to his customers a handsome 1914 calendar imitating tapestry and which contains a reproduction of Leo A. Stahr's painting "In the North Woods."

Metals.—The U. S. Reduction Company, of Chicago, Ill., have issued an attractive calendar containing a photogravure of their East Chicago, Ind., works. This company produce virgin

pig metals and alloys and make a specialty of aluminum and babbitt metals.

Presses.—Heating, chilling and die presses is the subject of the catalog No. 89, just issued by the Watson-Stillman Company, New York. The catalog contains fifty-six pages and gives complete descriptions and illustrations of the extensive line of presses manufactured by this firm. Copies of this catalog may be had upon request.

Chucks.—The Hannifin Manufacturing Company, Chicago, Ill., have issued a four-page pamphlet containing a description of the Hannifin air operated chucks. These chucks include the two and three jaw universal, two jaw revolving jaw and master hinge collet chuck. The folder gives illustrations of various machines showing the different kinds of chucks in place and explaining the variety of work that can be performed with them.

CATALOG EXHIBIT

An exhibition of every kind of catalog may be seen at The Metal Industry office, 99 John street, New York. The Metal Industry is prepared to do all of the work necessary for the making of catalogs, pamphlets, circulars and other printed matter. Estimates will be furnished for writing descriptions, making engravings, printing, binding, for the entire job from beginning to end or any part of it.

METAL MARKET REVIEW

NEW YORK, March 9, 1914.

COPPER.

The copper business during the month of February has been dull, consumers seem to have overbought on the last advance, and trade has not been as brisk as expected. The copper producers' figures, published on the 8th of February, showing a decrease of over 4,000,000 pounds, did not have much effect on the trade, and the market today looks more or less top-heavy.

Producers and selling agents have held their price at 14⅞ for electrolytic, but dealers and second hands have made lower offers, and towards the end of the month electrolytic was obtainable at 14⅜ cents, with lake at 14⅞, and casting at 14¼.

The exports were very heavy again, being over 34,000 tons, making a total for the two months of over 70,000 tons, an increase of 18,000 tons over the same period last year. It is interesting to note that with these enormous exports the stocks of copper in Europe show a decrease for the month of about 1,000 tons. Germany seems to be the heaviest consumer of the red metal today.

TIN.

As usual, the much-exploited "bull" crowd in London worked in the other direction and prices sagged off about 3 cents per pound from the highest, and closed at about the lowest point for the month. Opening at around 40¾ cents, prices dropped to 38 and then jumped to 41¼, but closed at 38 cents. The deliveries for the month were good, 3,300 tons, and the month of March should show bigger deliveries.

LEAD.

During the month of February the Trust reduced the price of lead $3 a ton to 4 cents a pound, New York, and the market today is more or less weak at that price, with St. Louis quoted at 3.85.

SPELTER.

The spelter market has held fairly steady at from 5.50 to 5.40 New York, closing at 5.40, with St. Louis quoted at 5.22½ to 5.25.

ALUMINUM.

The aluminum market is a little easier than a month ago, and closed at a decline of nearly ½ cent per pound at 18⅝ for domestic or foreign ingots 98.99 per cent. pure.

ANTIMONY.

There has been very little change in the antimony market. Cookson's is quoted today at 7¼ cents, Hallett's 7 cents, and Hungarian grade at around 6 cents.

SILVER.

The silver market in New York has fluctuated between 57⅜ and 57¾, and closed at 58⅛, with London at around 26⅝d.

PLATINUM.

Prices here are unchanged, but the market abroad is firmer and higher prices may shortly develop. Ordinary refined is quoted at $43 to $44 per ounce, with 10 per cent. hard at $46 and 20 per cent. hard at $49.

QUICKSILVER.

The wholesale price of quicksilver has been held at $38 per flask, with jobbers asking $39 to $39.50 for smaller lots.

SHEET METALS.

There has been no further change in the price of sheet copper or brass. Sheet copper is quoted at 20 cents base, high sheet brass at 14½ cents, and copper wire at 15¾ to 16 cents.

OLD METALS.

The old metal market has been dull and stagnant. With very slight fluctuations in the prices of new metals there has not been much money in old metals. There has been a little better demand from Europe, but prices are not satisfactory.—J. J. A.

FEBRUARY MOVEMENTS IN METALS

	Highest.	Lowest.	Average.
COPPER.			
Lake	15.00	14.75	15.00
Electrolytic	14.85	14.35	14.70
Casting	14.50	14.00	14.25
TIN	41.25	38.00	40.00
LEAD	4.15	4.00	4.10
SPELTER	5.50	5.40	5.45
ANTIMONY (Hallett's)	7.00	7.00	7.00
SILVER	57¾	57⅜	57.60

WATERBURY AVERAGE

The average price of Lake Copper per pound as determined monthly at Waterbury, Conn.

1912—Average for year, 16.70. 1913—Average for year, 15.83. 1914—January, 14.75; February, 15.125.

COPPER PRODUCTION

(Issued by the Copper Producers' Association.)

		March 9, 1914. Pounds.
Stocks of marketable copper of all kinds on hand at all points in the United States, February 1, 1914..		87,296,685
Production of marketable copper in the United States from all domestic and foreign sources during February, 1914		122,561,007
		209,857,692
Deliveries:		
For domestic consumption	47,586,657	
For export	83,899,183	
		131,485,840
Stocks of marketable copper of all kinds on hand at all points in the United States, March 1, 1914....		78,371,852
Stocks decreased during the month of February..		8,924,833

DAILY METAL PRICES

We have made arrangements with the New York Metal Exchange by which we can furnish our readers with the Official Daily Market Report of the Exchange and a year's subscription to THE METAL INDUSTRY for the sum of $10. The price of the Report alone is $10. Sample copies furnished for the asking. We can furnish daily telegraphic reports of metal prices. Address THE METAL INDUSTRY, 99 John street, New York.

Metal Prices, March 9 , 1914

METAL PRICES.

	Price per lb. Cents.
COPPER—PIG AND INGOT AND OLD COPPER. Duty Free. Manufactured 5 per centum.	
Lake, carload lots, nominal	15.00
Electrolytic, carload lots	14.75
Castings, carload lots	14.50
TIN—Duty Free.	
Straits of Malacca, carload lots	38.00
LEAD—Duty Pig, Bars and Old, 25%; pipe and sheets, 25%. Pig lead, carload lots	4.00
SPELTER—Duty 15%. Sheets, 15%.	
Western, carload lots	5.40
ALUMINUM—Duty Crude, 2c. per lb. Plates, sheets, bars and rods, 3½c. per lb.	
Small lots, f. o. b. factory	23.00
100 lb. lots, f. o. b. factory	21.00
Ton lots, f. o. b. factory	19.00
ANTIMONY—Duty free.	
Cookson's cask lots, nominal	7.25
Hallett's cask lots	7.00
Hungarian grade	6.00
NICKEL—Duty Ingot, 10%. Sheet, strip and wire 20% ad. valorem.	
Shot, Plaquettes, Ingots. Blocks according to quantity	.40 to .45
ELECTROLYTIC—3 cents per pound extra.	
MANGANESE METAL—Duty 10%	.90
MAGNESIUM METAL.—Duty 25% ad valorem (100 lb. lots)	1.50
BISMUTH—Duty free	2.00
CADMIUM—Duty free	.95
CHROMIUM METAL—Duty free	.98
QUICKSILVER—Duty 10%	.53
	Price per oz.
GOLD—Duty free	$20.67
PLATINUM—Duty free	43.50
SILVER—Government assay bars—Duty free	.58⅛

INGOT METALS.

	Price per lb. Cents.
Silicon Copper, 10%.....according to quantity	27 to 32
Silicon Copper, 20%..... " "	34 to 36
Silicon Copper, 30% guaranteed " "	36 to 38
Phosphor Copper, guaranteed 15% "	21½ to 27½
Phosphor Copper, guaranteed 10% "	23 to 27
Manganese Copper, 25%..... " "	25 to 29
Phosphor Tin, guaranteed 5%. " "	61 to 63
Phosphor Tin, no guarantee.. " "	43 to 46
Brass Ingot, Yellow..... " "	10½ to 10⅝
Brass Ingot, Red..... " "	12 to 14
Bronze Ingot ..... " "	13 to 14½
Manganese Bronze Ingots.... " "	15½ to 16
Phosphor Bronze ..... " "	18 to 20
Casting Aluminum Alloys.... " "	16 to 18

PHOSPHORUS—Duty free.
According to quantity..... 30 to 35

OLD METALS.

Dealers' Buying Prices. Cents per lb.		Dealers' Selling Prices. Cents per lb.
12.75 to 13.00	Heavy Cut Copper	14.00 to 14.25
12.50 to 12.75	Copper Wire	13.50 to 13.75
11.25 to 11.50	Light Copper	12.50 to 12.75
10.50 to 10.75	Heavy Mach. Comp.	12.50 to 12.75
7.25 to 7.50	Heavy Brass	8.75 to 9.00
6.25 to 6.50	Light Brass	7.75 to 8.00
7.50 to 7.75	No. 1 Yellow Brass Turnings	8.00 to 8.50
9.50 to 10.00	No. 1 Comp. Turnings	10.75 to 11.00
3.50 to ——	Heavy Lead	—— to 3.90
3.75 to ——	Zinc Scrap	4.15 to 4.25
5.50 to 6.50	Scrap Aluminum Turnings	7.00 to 8.00
11.50 to 12.00	Scrap Aluminum, cast, alloyed	13.00 to 14.00
13.00 to 14.00	Scrap Aluminum, sheet (new)	14.00 to 15.00
23.00 to 24.00	No. 1 Pewter	25.00 to 26.00
20.00 to 23.00	Old Nickel	20.00 to 23.00

PRICES OF SHEET COPPER.

BASE PRICE, 20 Cents per Lb. Net.

SIZE OF SHEETS. Width.	LENGTH.	64 oz. and over.	32 oz. to 64 oz.	24 oz. up to 32 oz.	16 oz. up to 24 oz.	15 oz.	14 oz.	13 oz.	12 oz.	11 oz.
		Extras in Cents per Pound for Sizes and Weights Other than Base.								
Not wider than 30 ins.	Not longer than 72 inches.	Base	Base	Base	Base	½	1	1½	2	2½
	Longer than 72 inches. Not longer than 96 inches.	"	"	"	"	½	1	2	3	4½
	Longer than 96 inches. Not longer than 120 inches.	"	"	½	1	2	3	5	7	
	Longer than 120 ins.	"	"	1	1½					
Wider than 30 ins. but not wider than 36 inches.	Not longer than 72 inches.	"	"	Base	Base	1	2	3	4	6
	Longer than 72 inches. Not longer than 96 inches.	"	"	"	"	1	2	4	6	8
	Longer than 96 inches. Not longer than 120 inches.	"	"	1	2	3	4			
	Longer than 120 inches.	"	1	2	3					
Wider than 36 ins. but not wider than 48 inches.	Not longer than 72 inches.	"	Base	1	2	3	4	6	8	9
	Longer than 72 inches. Not longer than 96 inches.	"	"	1	3	4	5	7	9	
	Longer than 96 inches. Not longer than 120 inches.	"	"	2	4	6	9			
	Longer than 120 inches.	"	1	3	6					
Wider than 48 ins. but not wider than 60 inches.	Not longer than 72 inches.	"	Base	1	3	5	7	9	11	
	Longer than 72 inches. Not longer than 96 inches.	"	"	2	4	7	10			
	Longer than 96 inches. Not longer than 120 inches.	"	1	3	6					
	Longer than 120 inches.	1	2	4	8					
Wider than 60 ins. but not wider than 72 ins.	Not longer than 96 inches.	Base	1	3	8					
	Longer than 96 inches. Not longer than 120 inches.	"	2	5	10					
	Longer than 120 inches.	1	3	8						
Wider than 72 ins. but not wider than 108 ins.	Not longer than 96 inches.	1	3	6						
	Longer than 96 inches. Not longer than 120 inches.	2	4	7						
	Longer than 120 inches.	3	5	9						
Wider than 108 ins., but not wider than 120 ins.	Not longer than 120 inches.	4	6							

The longest dimension in any sheet shall be considered at its length.

CIRCLES, 8 IN. DIAMETER AND LARGER, SEGMENTS AND PATTERN SHEETS, advance per pound over prices of Sheet Copper required to cut them from ..... 3c.

CIRCLES LESS THAN 8 IN. DIAMETER, advance per pound over prices of Sheet Copper required to cut them from ..... 5c.

COLD OR HARD ROLLED COPPER, 14 oz. per square foot and heavier, advance per pound over foregoing prices ..... 1c.

COLD OR HARD ROLLED COPPER, lighter than 14 oz. per square foot, advance per pound over foregoing prices ..... 2c.

COLD ROLLED ANNEALED COPPER, the same price as Cold Rolled Copper.

ALL POLISHED COPPER, 20 in. wide and under, advance per square foot over the price of Cold Rolled Copper ..... 1c.

ALL POLISHED COPPER, over 20 in. wide, advance per square foot over the price of Cold Rolled Copper ..... 2c.

For Polishing both sides, double the above price.

The Polishing extra for Circles and Segments to be charged on the full size of the sheet from which they are cut.

COLD ROLLED COPPER, prepared suitable for polishing, same prices and extras as Polished Copper.

ALL PLANISHED COPPER, advance per square foot over the prices for Polished Copper ..... 1c.

ZINC— Duty, sheet, 15%. Cents per lb.
Carload lots, standard sizes and gauges, at mill.....7.25 basis, less 8%
Casks, jobbers' prices ..... 8c.
Open casks, jobbers' prices ..... 8½c.

Metal Prices, March 9, 1914

PRICES ON BRASS MATERIAL—MILL SHIPMENTS.

In effect February 2, 1914, and until further notice.

To customers who buy over 5,000 lbs. per year.

	Net base per lb. High Brass.	Low Brass.	Bronze.
Sheet	$0.14½	$0.16⅝	$0.17¾
Wire	.14¼	.16⅝	.17¾
Rod	.14¼	.17⅛	.18¾
Brazed tubing	.19	—	.22½
Open seam tubing	.19	—	.22½
Angles and channels, plain	.19	—	.22½

50% discount from all extras as shown in American Brass Manufacturers' Price List No. 9.

NET EXTRAS FOR QUALITY.

Sheet—Extra spring, drawing and spinning brass.... ½c. per lb. net advance
" —Best spring, drawing and spinning brass.... 1½c. " " " "
Wire —Extra spring and brazing wire..... ½c. " " " "
" —Best spring and brazing wire..... 1c. " " " "

To customers who buy 5,000 lbs. or less per year.

	Net base per lb. High Brass.	Low Brass.	Bronze.
Sheet	$0.15¾	$0.17⅝	$0.19
Wire	.15½	.17⅝	.19
Rod	.15½	.18¾	.20
Brazed tubing	.20¼	—	.23¾
Open seam tubing	.20¼	—	.23¾
Angles and channels, plain	.20¼	—	.23¾

Net extras as shown in American Brass Manufacturers' Price List No. 9.

NET EXTRAS FOR QUALITY.

Sheet—Extra spring, drawing and spinning brass.... ½c. per lb. net advance
" —Best spring, drawing and spinning brass.... 1½c. " " " "
Wire—Extra spring and brazing wire ..... ½c. " " " "
" —Best spring and brazing wire ..... 1c. " " " "

BARE COPPER WIRE—CARLOAD LOTS.

15⅛c. per lb. base.

SOLDERING COPPERS.

500 lbs. and over in one order	20¼c. per lb. base
100 lbs. to 500 lbs. in one order	21c. " " "
Less than 100 lbs. in one order	22½c. " " "

PRICES FOR SEAMLESS BRASS TUBING.

From 1¼ to 3½ O. D. Nos. 4 to 13 Stubs' Gauge, 19c. per lb.
Seamless Copper Tubing, 22½c. per lb.

For other sizes see Manufacturers' List.

PRICES FOR SEAMLESS BRASS TUBING Iron Pipe Sizes.

Iron pipe sizes with price per pound.

⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6
27	26	21	20	19	19	19	19	19	19	19	20	21	23	25	26

PRICE LIST OF IRON LINED TUBING—NOT POLISHED.

	Per 100 feet Brass.	Bronze.
⅜ inch	$8	$9
½ inch	8	9
⅝ inch	10	11
¾ inch	12	13
⅞ inch	14	15
1 inch	18	20
1⅛ inch	22	24
1¼ inch	25	27
1½ inch	32	35
1¾ inch	45	48
2 inch	56	69

Discount 50—5%.

PRICE FOR TOBIN BRONZE AND MUNTZ METAL.

Tobin Bronze Rod	18c.	net base
Muntz or Yellow Metal Sheathing (14" x 48")	15c.	" "
" " " Rectangular sheets other than Sheathing	17½c.	" "
" " " Rod	15c.	" "

Above are for 100 lbs. or more in one order.

PLATERS' METALS.

Platers' bar in the rough, 24¼c. net.

German silver platers' bars dependent on the percentage of nickel, quantity and general character of the order.

Platers' metal, so called, is very thin metal not made by the larger mills and for which prices are quoted on application to the manufacturers.

PRICES FOR SHEET BLOCK TIN AND BRITANNIA METAL.

Sheet Block Tin—18" wide or less. No. 26 B. & S. Gauge or thicker. 100 lbs. or more 5c. over Pig Tin. 50 to 100 lbs. 6c. over, 25 to 50 lbs. 8c. over, less than 25 lbs. 10c. over.

No. 1 Britannia—18" wide or less. No. 26 B. & S. Gauge or thicker, 100 lbs. or more 4c. over Pig Tin. 50 to 100 lbs. 5c. over, 25 to 50 lbs. 7c. over, less 25 lbs. 9c. over.

Above prices f. o. b. mill.

Prices on wider or thinner metal on request.

PRICE SHEET FOR SHEET ALUMINUM—B. & S. Gauge.

Gauge.	Width. Inches.	1 ton.	500 lbs.	50 lbs.	Less than 50 lbs.
20 and heavier	3-30	30c.	34c.	36c.	38c.
	3-30	32c.	35c.	37c.	39c.
21 to 24 inclusive	30-48	33c.	37c.	39c.	41c.
	48-60	39c.	40c.	42c.	44c.
25 and 26	3-30	33c.	36c.	38c.	40c.
	30-48	35c.	38c.	40c.	42c.
27	3-30	36c.	37c.	39c.	41c.
	30-48	39c.	40c.	42c.	44c.
28	3-30	37c.	38c.	40c.	42c.
	30-48	40c.	41c.	43c.	45c.
29	3-30	38c.	39c.	41c.	43c.
	30-48	42c.	43c.	45c.	47c.
30	3-30	39c.	40c.	42c.	44c.

The above prices refer to lengths between 2 and 8 feet. Prices furnished by the manufacturers for wider and narrower sheet. No charge for boxing. F. O. B. Mill.

PRICE LIST SEAMLESS ALUMINUM TUBING.

STUBS' GAUGE THE STANDARD. SIZES CARRIED IN STOCK.
Outside Diameters. BASE PRICE, 24 Cents per Pound.

Stubs' Gauge.	Inches.	¼ in.	5-16 in.	⅜ in.	½ in.	⅝ in.	¾ in.	⅞ in.	1 in.	1¼ in.	1½ in.	1¾ in.	2 ins.	2½ ins.	3 ins.	3½ ins.	4 ins.	4½ ins.
11.	.120.	..	..	..	..	..	..	..	26	23	..	..	13	19	9	8	15	23
12.	.109.	..	..	..	..	..	..	..	25	..	..	..	14	..	..	..	..	..
14.	.083.	..	..	..	..	..	..	..	..	..	..	..	16	..	..	..	..	..
16.	.065.	..	..	..	..	..	27	26	26	22	22	20	20	20	20	26	30	36
18.	.049.	..	..	..	..	32	29	28	27	24	25	25	25	..	..	..	..	..
20.	.035.	116	..	45	38	33	32	31	29	28	29	29	29	30	37	48	57	80
21.	.032.	..	..	..	39	..	..	..	..	..	..	..	..	..	..	..	..	..
22.	.028.	137	97	47	41	37	36	34	33	..	..	44	..	..	..	..	..	..
24.	.022.	187	132	107	87	78	72	61	59	65	..	..	..	..	..	..	..	..

Prices are for ten or more pounds at one time. For prices on sizes not carried in stock send for Manufacturers' List.

PRICE LIST FOR ALUMINUM ROD AND WIRE.

Diameter. B. & S. G'ge	000 to No. 10.	No. 11.	No. 12.	No. 13.	No. 14.	No. 15.	No. 16.	No. 17.	No. 18.	No. 19.	No. 20.	No. 21.	No. 22.
Price per lb....	33	33½	33½	34	34½	35	35½	36	37	38	39	44	47

BASE PRICE GRADE "B" GERMAN SILVER SHEET METAL.

Quality.	Net per lb.	Quality.	Net per lb.
5%	18¼c.	16%	22¾c.
8%	20c.	18%	23¼c.
10%	20½c.	20%	26½c.
12½	21½c.	25%	33¾c.
15%	22½c.	30%	39¾c.

GERMAN SILVER WIRE.

Quality.	Net per lb.	Quality.	Net per lb.
5%	19¼c.	15%	26½c.
8%	21c.	16%	27½c.
10%	22½c.	18%	29¼c.
12%	24½c.	30%	45¼c.

The above Base Prices are subject to additions for extras as per lists printed in The American Brass Manufacturers' Price List No. 9, and from such extras 50% discount will be allowed. The above base prices and discounts are named only to wholesale buyers who purchase in good quantities. Prices on small lots are considerably higher.

PRICES OF SHEET SILVER.

Rolled sterling silver .925 fine is sold according to gauge quantity and market conditions. No fixed quotations can be given, as prices range from 1c. below to 4c. above the price of bullion.

Rolled silver anodes .999 fine are quoted at 2½c. to 3½c. above the price of bullion.